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54 Oxime-carbamates and oxime-carbonates as bronchodilators and anti-inflammatory agents.

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| EP-A- 0 186 817 | EP-A- 0 428 302 |
| WO-A-87/06576 | DE-A- 2 655 369 |
| DE-A- 3 438 839 | FR-A- 2 201 885 |
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CHEMICAL ABSTRACTS, vol. 96, Columbus, Ohio, US; abstract no. 142811, W. SCHLIEMANN: 'Synthesis of some derivatives of 3,6-diphenyl-s-tetrazine' & Wiss. Z., vol. 30, (1981), pages 65-9

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Description

This invention relates to novel aryl oxime-carbamates and carbonates having bronchodilatory and anti-inflammatory activities and being useful in the treatment of asthma.

Asthma is a disease in which respiratory distress is produced as a result of airway narrowing. This narrowing is caused largely by 1) the acute constriction of the respiratory smooth muscle that surrounds the airways and 2) chronic inflammation within the lung. Agents that reverse bronchospasm and prevent pulmonary inflammation are thus useful in the relief of the symptoms of asthma.

One approach for reversing bronchospasm and also inhibiting inflammation is to elevate intracellular adenosine cyclic 3':5'-monophosphate (cAMP) in respiratory smooth muscle and inflammatory cells, respectively. Agents that elevate smooth muscle cAMP concentrations induce rapid bronchodilation and inhibit the release of inflammatory mediators from activated leukocytes [see Hardman, in Smooth Muscle, An Assessment of Current Knowledge, Univ. of Texas Press, (1981); and Nielson et al., American Review of Respiratory Disease,

137,

(1988)]. By virtue of their dual mechanisms of action, these compounds are expected to be highly effective as anti-asthmatic drugs.

Cyclic AMP concentrations within the living cell are determined by both the rate of its synthesis by adenylate cyclase and the rate of its degradation by phosphodiesterases (PDEs). Thus, either stimulating adenylate cyclase or inhibiting PDEs in pulmonary tissues can result in anti-asthmatic activities. This invention relates to compounds that inhibit a specific PDE, often called PDE IV, which selectively metabolizes cAMP and which is insensitive to the modulatory effects of guanosine cyclic 3':5'-monophosphate (cGMP) and calcium. This PDE is found in both respiratory smooth muscle and inflammatory cells, and has been demonstrated to be a principal regulator of cAMP in these tissues [see Torphy and Cieslinski, Molecular Pharmacology,

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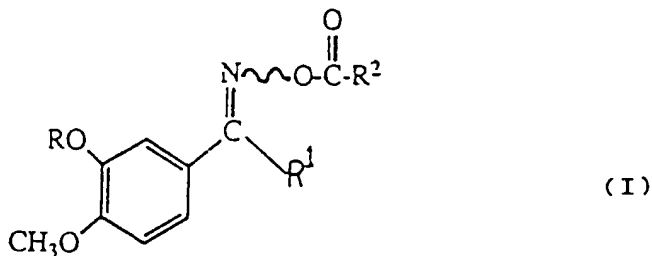
(1990), and Dent et al., British Journal of Pharmacology,

90,

(1990)]. Consequently, the compounds of the invention are bronchodilatory and antiinflammatory, and exhibit activity in animal models of allergic and nonallergic asthma. However, because the compounds of the invention have not been found to inhibit other forms of PDE, they are deemed to be more selective and safer anti-asthmatics than nonselective PDE inhibitors currently used for the treatment of asthma, such as theophylline.

Substituted benzaldehydes, phenylketones and phenylketoximes are disclosed in the following references: DE-A-2655369, DE-A-3438839, WO-A-87/06576, EP-A-428302, EP-A-186817 and Chemical Abstracts 96:142811 and 110:75441. Oxime carbonates are disclosed in FR-A-2244499, 2204406 and 2201885.

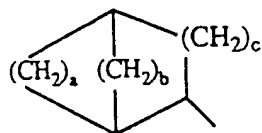
The invention provides novel compounds of the formula



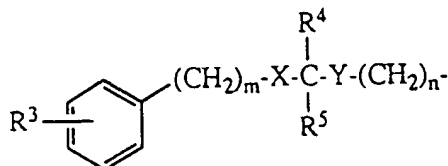
wherein

R is C₃₋₇ alkyl, C₃₋₇ cycloalkyl,

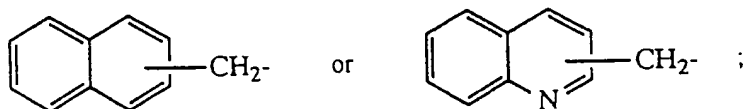
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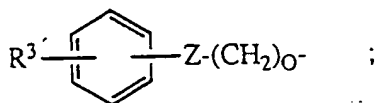
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R¹ is hydrogen, lower alkyl or

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a is 1-3; b is 1-3; c is 0-2;

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X, Y and Z are each, independently, a bond, O, S or NH, with the proviso that if one of X or Y is O, S or NH, the other must be a bond;

R² is amino, loweralkylamino, arylamino, loweralkoxy or aryloxy;

R³ and R^{3'} are independently hydrogen, halo, hydroxy, lower alkoxy, aryloxy, loweralkanoyloxy, amino, lower alkylamino, arylamino or loweralkanoylamino;

R⁴ and R⁵ are each independently hydrogen or lower alkyl; m is 0-4; n is 1-4; and o is 1-4.

35

The terms "lower alkyl", "lower alkoxy" and "lower alkanoyl" refer to moieties having 1 to 6 carbon atoms in the carbon chain. The term "aryl" refers to aromatic moieties having 6-10 carbon atoms. The term "halo" refers to fluoro chloro and bromo.

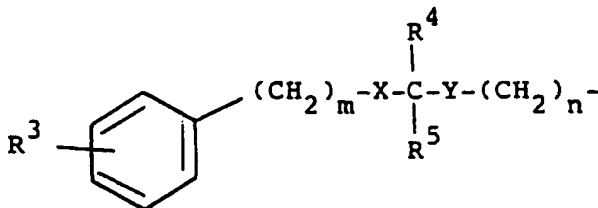
Examples of lower alkyl when used as a group or part of a group e.g alkoxy are methyl, ethyl, propyl, isopropyl, butyl.

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Examples of lower alkanoyloxy and lower alkanoyl-amino are groups of formula lower alkyl COO- and loweralkyl CONH- where lower alkyl is exemplified as above.

Examples of R are cycloalkyl groups of 3-7 carbon atoms such as cyclopentyl, and alkyl groups of 3 to 7 carbon atoms such as butyl. When R is a group of formula

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an example of m is zero; R⁴ and R⁵ may be for example hydrogen;

X can be for example O; n may be for example 1, 2, or 3; and R³ is exemplified by hydrogen, halo, hydroxy, acetoxy, amino or acetamido, the combination of said values being preferred.

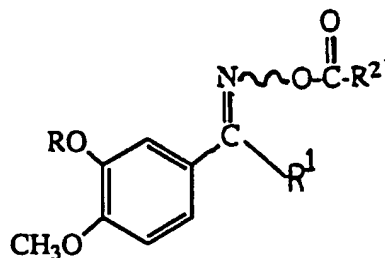
Examples of a, b and c are 2, 1 and 1 respectively or 2, 2 and 0 respectively.

Examples of R^3 are the same as for R^3 above.

Preferably Z is a direct bond.

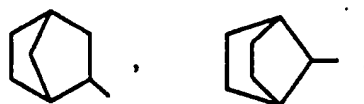
Examples of R^2 are NH_2 , $NHMe$, $NHPh$, OMe , OPh .

The especially preferred compounds are those having the formula

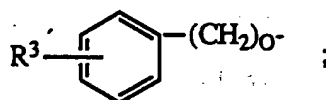


wherein

R is (C_3-7) alkyl, (C_3-7) cycloalkyl,



R^1 is hydrogen, lower alkyl or



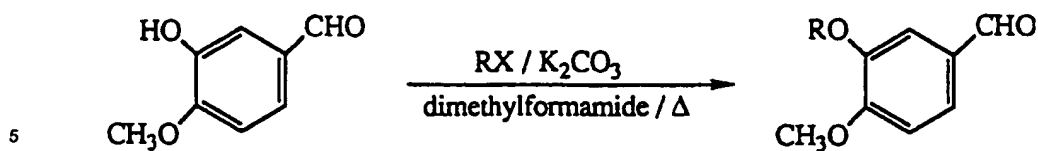
R^2 is amino, loweralkylamino, arylamino, loweralkoxy or aryloxy;

R^3 and R^3 are independently hydrogen, halo, hydroxy, acetoxy, amino or acetamido;

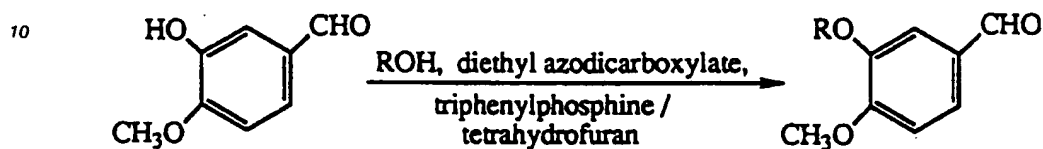
o is 1-4; and p is 2-4.

The most preferred compounds are those in which R^2 is amino.

The compounds of the invention can be prepared by a basic reaction sequence, in which in the initial step isovanillin is reacted with a suitable R group-containing derivative, to yield an isovanillin intermediate with the appropriately substituted hydroxy group:



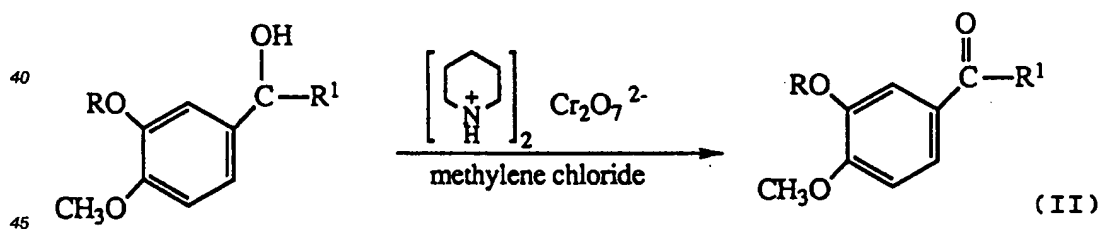
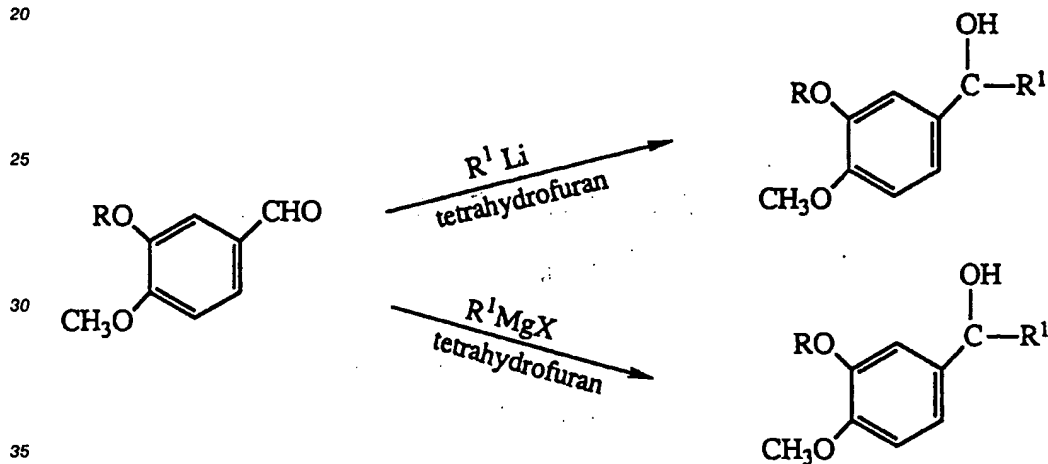
OR



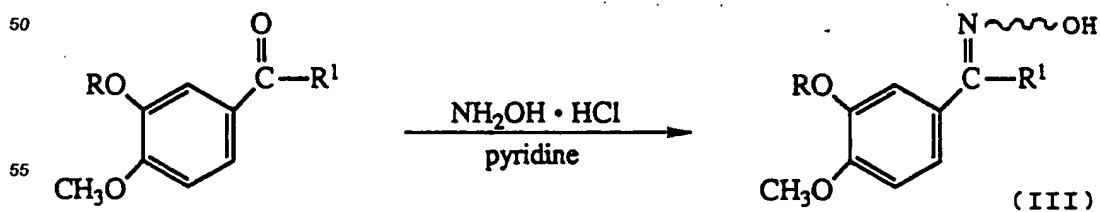
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The latter is then reacted with an R^1 lithium derivative or appropriate Grignard reagent, followed by oxidation with pyridinium dichromate or MnO_2 to yield an appropriate ketone derivative

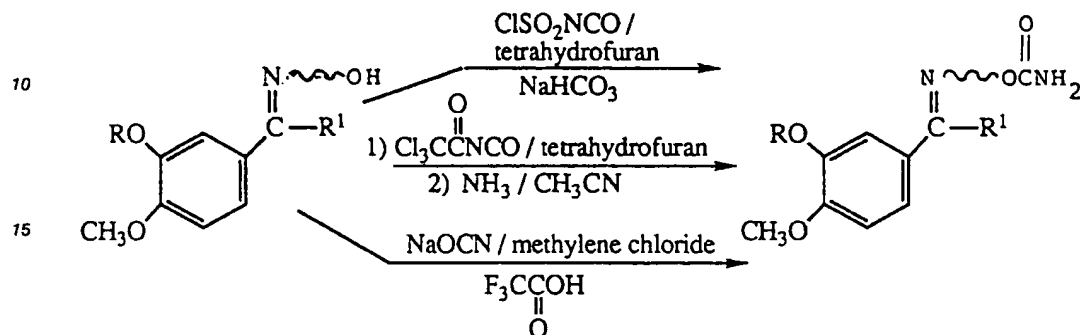
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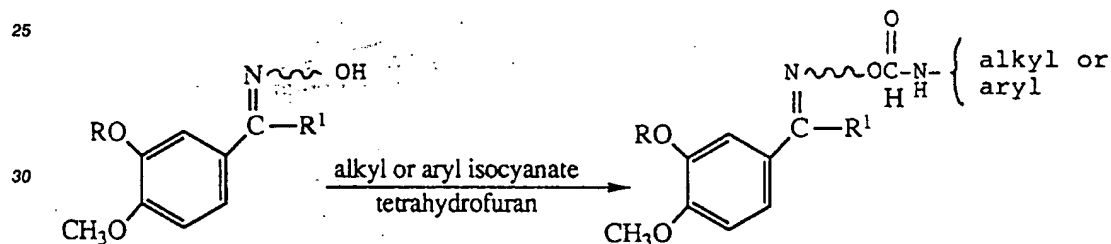
The ketone is then reacted with hydroxylamine hydrochloride, to yield the corresponding ketone oxime.



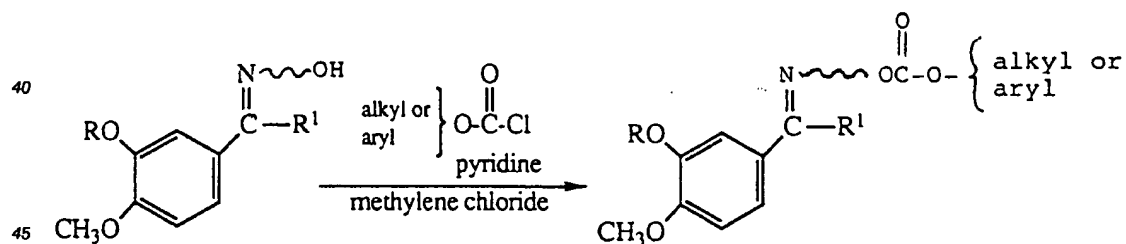
This ketone oxime is then reacted with appropriate reactants to yield the desired final product oxime carbamates or oxime carbonates. Thus, in order to prepare the *N*-unsubstituted oxime carbamates, an intermediate ketone oxime can be reacted with 1) chlorosulfonyl isocyanate in dry tetrahydrofuran, or with 2) trichloroacetyl isocyanate in dry tetrahydrofuran followed by reacting with ammonia, or with 3) sodium cyanate and trifluoroacetic acid in methylene chloride, or with 4) sodium cyanate and acetic acid and water:



In like manner, *N*-substituted carbamates can be prepared by using an appropriately substituted alkyl or aryl isocyanate in dry tetrahydrofuran:



Finally, the oxime carbonates can be prepared by reacting the intermediate ketone oxime with an appropriate alkyl or aryl chloroformate in pyridine and methylene chloride:



Of course, other methods of preparation, which will occur to those skilled in the art, may also be employed to prepare the compounds of this invention.

The starting materials used in the above-described preparative routes are commercially available, or can be made according to procedures taught in the chemical literature.

By virtue of possessing a double bond, the compounds of the invention possess *cis-trans* isomerism and hence the compounds of the invention embrace not only geometrical isomer mixtures, but the individual isomers as well. The isomers are designated according to the *E/Z*-system using the sequence rule.

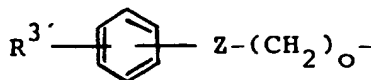
E/Z isomers may generally be prepared from the corresponding oxime precursors by processes described hereinabove. *E/Z* isomers of the oximes may themselves generally be prepared by oximation of the ketone, with shorter reaction times generally favouring formation of the *Z* isomer, and longer reaction

times favouring formation of the E-isomer. The E, Z isomers can generally be separated either at the oxime stage or at the final product stage.

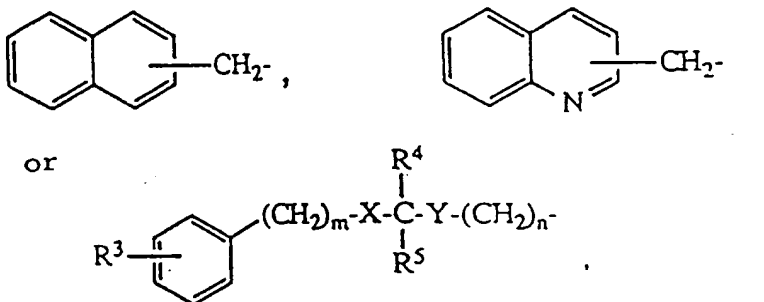
The E form is preferred.

Certain intermediate oximes and ketones of formula II and III as defined above are also within the scope of this invention including methods for preparing them.

In particular this invention provides (i) oximes of formula III as hereinbefore defined wherein R and R' are as defined above providing that when R' is hydrogen then R is other than C₃-C₇ alkyl;
(ii) compounds of formula II as defined above wherein R' is



and (iii) a compound of formula II as defined above wherein a) R' is C₁-C₄ alkyl and R is



providing that the latter group has more than 8 carbon atoms when X and Y are both bonds, and further providing that R is other than PhCH₂OCH₂- when R' is methyl, or
b) R' is alkyl wherein the number of carbon atoms is greater than 4 and not more than 6 and R is as herein defined.

The compounds of the invention, by virtue of their ability to inhibit PDE IV, are bronchodilatory and antiinflammatory, and are useful in the treatment of acute and chronic bronchial asthma and its associated pathology.

When the compounds of the invention are employed in the treatment of acute or chronic bronchial asthma, they can be formulated into oral dosage forms such as tablets, capsules and the like. The compounds can be administered alone or by combining them with conventional carriers, such as magnesium carbonate, magnesium stearate, talc, sugar, lactose, pectin, dextrin, starch, gelatin, tragacanth, methylcellulose, sodium carboxymethylcellulose, low melting wax, cocoa butter and the like. Diluents, flavoring agents, solubilizers, lubricants, suspending agents, binders, tablet-disintegrating agents and the like may be employed. The compounds may also be injected parenterally, in which case they are used in the form of a sterile solution containing other solutes, for example, enough saline or glucose to make the solution isotonic. For administration by inhalation or insufflation, the compounds may be formulated into an aqueous or partially aqueous solution, which can then be utilized in the form of an aerosol.

The dosage requirements vary with the particular compositions employed, the route of administration, the severity of the symptoms presented and the particular subject being treated. Treatment will generally be initiated with small dosages, less than the optimum dose of the compound. Thereafter the dosage is increased until the optimum effect under the circumstances is reached. In general, the compounds of the invention are most desirably administered at a concentration that will generally afford effective results without causing any harmful or deleterious side effects, and can be administered either as a single dose, or if desired, the dosage may be divided into convenient subunits administered at suitable times throughout the day.

Accordingly this invention also provides a pharmaceutical composition comprising a compound of formula I as defined hereinabove and a pharmaceutical carrier.

The PDE IV inhibitory effects of the compounds of the invention may be demonstrated by standard pharmacological procedures, which are described more fully in the examples given hereinafter.

These procedures illustrate the ability of the compounds of the invention to inhibit PDE IV isolated from canine trachea.

The following examples show the preparation and pharmacological testing of compounds within the invention.

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Example 1

1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl)oxime

10 A) 3-Cyclopentyloxy-4-methoxybenzaldehyde

To a magnetically-stirred solution of isovanillin (0.557 mol, 85.0 g) in dry dimethylformamide (500 mL) at room temperature was added powdered K_2CO_3 (0.558 mol, 77.1 g) in one portion followed by dropwise addition of neat cyclopentyl bromide (0.614 mol, 91.5 g; 65.9 mL). The resulting suspension is warmed to 60 °C and the reaction monitored by TLC until complete. Upon completion, the reaction mixture is cooled to room temperature and the dimethylformamide removed *in vacuo*. The residue is partitioned between water and ethyl acetate, the aqueous phase extracted with ethyl acetate and the combined organic layers are washed with water. The organics are dried (Na_2SO_4) and concentrated *in vacuo* to afford the alkylated product (0.317 mmol, 70.1 g; 57%) as a viscous oil which is of sufficient purity to be used as such in subsequent transformation.

15 NMR (DMSO- d_6 , 300 MHz): δ 9.83 (s, 1H), 7.52 (dd, J = 8.5; 2.0 Hz, 1H), 7.36 (d, J = 2.0 Hz, 1H), 7.16 (d, J = 8.5 Hz, 1H), 4.84 (m 1H), 3.83 (s, 3H), 1.70 (m, 8H).

20 B) α -Methyl-3-cyclopentyloxy-4-methoxybenzyl alcohol

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxybenzaldehyde (59.0 mmol, 13.0 g) in dry tetrahydrofuran (500 mL) at -78 °C is added methyllithium (100 mmol, 90.0 mL; 1.4 M solution in ethyl ether) dropwise over 30 minutes. The resulting solution is stirred at -78 °C for 30 minutes and quenched at -78 °C by the rapid addition of aqueous saturated NH_4Cl (140 mL). After warming to room temperature, water is added to dissolve the solids and the tetrahydrofuran was removed *in vacuo*. The residue is partitioned between water (500 mL) and ethyl acetate (500 mL), the aqueous phase extracted with ethyl acetate (500 mL) and the combined organic layers are washed with water (500 mL). The organics are dried (Na_2SO_4) and concentrated *in vacuo* to afford the title compound as a light yellow oil (58.3 mmol, 13.7g; 99%). This material is of sufficient purity by TLC and NMR to be used as such in the subsequent transformation.

30 NMR (DMSO- d_6 , 300 MHz) δ 6.91 (d, 1H), 6.84 (m, 2H), 5.00 (d, 1H), 4.76 (m, 1H), 3.70 (s, 3H), 1.70 (m, 8H), 1.27 (d, 3H).

35 C) 3-Cyclopentyloxy-4-methoxyacetophenone

To a magnetically-stirred solution of α -methyl-3-cyclopentyloxy-4-methoxybenzyl alcohol (58.3 mmol, 13.7 g) in dry methylene chloride (400 mL) at room temperature is added pyridinium dichromate (87.3 mmol, 32.8 g) in one portion. The resulting heterogeneous solution is stirred at room temperature overnight after which TLC indicated complete conversion to a faster running, UV-active spot. The reaction mixture is diluted with an equal volume of ethyl ether and stirred for 1 hr. The mixture is filtered through Celite and the filter cake was washed with ethyl ether (300 mL) and ethyl acetate (300 mL). The brown filtrate is concentrated *in vacuo* and purified by filtration through a plug of silica gel (methylene chloride eluent). The organics are removed *in vacuo* to afford the title compound as a light yellow solid (58.3 mmol, 13.6 g; 100%).

45 NMR (DMSO- d_6 , 300 MHz) δ 7.59 (dd, J = 8.5 Hz; 2.0 Hz, 1H), 7.40 (d, J = 2.0 Hz, 1H), 7.03 (d, J = 8.5 Hz, 1H), 4.82 (m, 1H), 3.80 (s, 3H), 2.50 (s, 3H), 1.70 (m, 8H).

D) 3-Cyclopentyloxy-4-methoxyacetophenone oxime

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxyacetophenone (58.3 mmol, 13.6 g) in dry pyridine (300 mL) at room temperature is added hydroxylamine hydrochloride (64.0 mmol, 4.45 g) in one portion. The resulting suspension slowly becomes homogeneous, and the solution is stirred at room temperature overnight. The pyridine is removed *in vacuo* and the residue is partitioned between ethyl acetate (500 mL) and water (500 mL). The aqueous phase is extracted with water (400 mL). The organics are dried (Na_2SO_4) and concentrated *in vacuo* to afford the title compound as a tan solid (56.5 mmol, 14.1 g; 97%). This material is of sufficient purity by TLC and NMR to be used as such in the subsequent transformation without purification.

55 NMR (DMSO- d_6 , 300 MHz) δ 11.0 (s, 1H), 7.24 (d, J = 2.0 Hz, 1H), 7.13 (dd, J = 8.5; 2.0 Hz, 1H), 6.94 (d, J = 8.5 Hz, 1H), 4.77 (m, 1H), 3.75 (s, 3H), 2.10 (s, 3H), 1.80 (m, 8H)

E) 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl) oxime

To a slowly-stirred suspension of NaOCN (160 mmol, 10.4 g.) in methylene chloride (30 mL) was added anhydrous trifluoroacetic acid (80.0 mmol, 9.12 g.; 6.16 mL) dropwise over 10 minutes at room temperature and the reaction vessel is loosely capped with a plastic stopper. The suspension slowly thickened to a gelatinous mass which is periodically agitated gently by hand. After 2 hours at room temperature, 3-cyclopentyloxy-4-methoxyacetophenone oxime (20.0 mmol, 4.98 g.) in methylene chloride (5 mL) is added in one portion and the reaction vessel is again stoppered. The reaction mixture is periodically agitated manually for 30 min. and then poured into saturated NaHCO₃ (250 mL) and extracted with methylene chloride (2 x 200 mL). The organic phase is washed with water (200 mL), dried (Na₂SO₄) and concentrated *in vacuo* to give a colorless oil. The oil was purified by flash chromatography (SiO₂: 1) 2.5% ethyl acetate/methylene chloride, 2) 5% ethyl acetate/methylene chloride), triturated with ethyl ether/hexane and dried *in vacuo* at 50 °C to afford analytically-pure title compound as a white solid (11.5 mmol, 3.37 g.; 58%).

NMR (DMSO-d₆, 300 MHz) δ 7.39 (d, J = 2.0 Hz, 1H), 7.35 (dd, J = 8.5; 2.0 Hz, 1H), 7.08 (br s, 2H), 6.85 (d, J = 2.0 Hz, 1H), 4.92 (m, 1H), 3.78 (s, 3H), 2.29 (s, 3H), 1.71 (m, 8H).

IR (KBr) (cm⁻¹) 3460, 3250, 2960, 1715, 1600, 1522, 1375, 1265, 1225, 1143, 993, 978.

MS (EI, m/e (%)) 292 (M⁺, 10), 249 (18), 181 (100), 164 (20), 124 (20).

Analysis for: C₁₅H₂₀N₂O₄

Calculated:	C, 61.63;	H, 6.90;	N, 9.58.
Found:	C, 61.66;	H, 7.06;	N, 9.60.

F) An alternative procedure to step E) is the following:

1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl) oxime

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxyacetophenone oxime (23.4 mmol, 5.83 g.) in dry tetrahydrofuran (200 mL) at 0 °C is added chlorosulfonyl isocyanate (35.1 mmol, 4.97 g.; 3.06 mL) dropwise over 5 minutes. The resulting yellow solution is stirred at 0 °C for 15 minutes, the tetrahydrofuran is removed *in vacuo*, and the residue is partitioned between ethyl acetate (200 mL) and water (200 mL). The aqueous phase is extracted with ethyl acetate (200 mL) and the combined organic layers are washed with water (200 mL) and aqueous saturated NaHCO₃ (200 mL). The organics are dried (Na₂SO₄) and concentrated *in vacuo* to give a dark oil. This material is purified by flash chromatography (SiO₂: 5 % ethyl acetate / methylene chloride) to give a light yellow solid which is subsequently triturated with a minimum of ethyl ether in hexane and collected by suction to afford the title compound as a white solid. The solid is dried overnight *in vacuo* at 50 °C to provide analytically-pure material (13.6 mmol, 3.97 g.; 58%).

NMR (DMSO-d₆, 300 MHz) δ 7.39 (d, J = 2.0 Hz, 1H), 7.35 (dd, J = 8.5, 2.0 Hz, 1H), 7.08 (br s, 2H), 6.85 (d, J = 2.0, 1H), 4.92 (m, 1H), 3.78 (s, 3H), 2.29 (s, 3H), 1.71 (m, 8H).

IR (KBr) (cm⁻¹) 3460, 3250, 2960, 1715, 1600, 1522, 1375, 1265, 1225, 1143, 993, 978.

MS (EI, m/e (%)) 292 (M⁺, 16), 224 (18), 182 (78), 180 (100), 164 (35), 140 (20), 124(26).

Analysis for: C₁₅H₂₀N₂O₄

Calculated:	C, 61.63;	H, 6.90;	N, 9.58.
Found:	C, 61.50;	H, 6.88;	N, 9.54.

Example 2

1-[3-(Butoxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl)oximeA) 3-Butoxy-4-methoxybenzaldehyde

Following the procedure of Example 1A, from isovanillin (0.557 mol, 85.0 g), powdered K₂CO₃ (0.558 mol, 77.1 g), and n-butyl bromide (0.559 mol, 76.6 g; 60.0 mL) in dry dimethylformamide (500 mL) is obtained the alkylated product (0.557 mol, 118 g; 100%) as a white solid in sufficient purity to be used as such.

NMR (DMSO-d₆, 300 MHz): δ 9.83 (s, 1H), 7.54 (dd, J = 8.5; 2.0 Hz, 1H), 7.38 (d, J = 2.0 Hz, 1H),

7.16 (d, J = 8.5 Hz, 1H), 4.00 (t, 2H), 3.85 (s, 3H), 1.70 (m, 2H), 1.43 (m, 2H), 0.92 (t, 3H).

B) α -Methyl-3-butoxy-4-methoxybenzyl alcohol

Following the procedure of Example 1B, from 3-butoxy-4-methoxybenzaldehyde (24 mmol, 5.0 g) and methyllithium (26.4 mmol, 18.9 mL; 1.4 M solution in ethyl ether) in dry tetrahydrofuran (150 mL) is obtained the alcohol (23.0 mmol, 5.15 g; 96%) which is shown to be about 93% pure by NMR. This material is used as such in the subsequent transformation without further purification.

NMR (CDCl₃, 300 MHz) δ 6.94 (d, J = 2.5 Hz, 1H), 6.85 (m, 2H), 4.82 (q, 1H), 4.01 (t, 2H), 3.85 (s, 3H), 1.82 (p, 2H), 1.50 (m, 3H), 0.97 (t, 2H).

C) 3-Butoxy-4-methoxyacetophenone

Following the procedure of Example 1C, from α -methyl-3-butoxy-4-methoxybenzyl alcohol (23 mmol, 5.15 g) and pyridinium dichromate (34.4 mmol, 12.95 g) in dry methylene chloride (150 mL) is obtained the ketone (21.6 mmol, 4.81 g; 94%) as a yellow solid of sufficient purity to be used as such without further purification.

NMR (CDCl₃, 300 MHz) δ 7.52 (dd, J = 8.5 Hz; 2.0 Hz, 1H), 7.51 (d, J = 2.0 Hz, 1H), 6.86 (d, J = 8.5 Hz, 1H), 4.05 (q, 2H), 3.90 (s, 3H), 2.55 (s, 3H), 1.83 (m, 2H), 1.48 (m, 2H), 0.95 (t, 3H).

D) 3-Butoxy-4-methoxyacetophenone oxime

Following the procedure of Example 1D, from 3-butoxy-4-methoxyacetophenone (15 mmol, 3.33 g) and hydroxylamine hydrochloride (16.5 mmol, 1.15 g) in dry pyridine (100 mL) is obtained the acetophenone oxime as a light yellow solid (13.17 mmol, 3.12 g; 88%) of sufficient purity to be used without further purification.

NMR (CDCl₃, 300 MHz) δ 11.0 (s, 1H), 7.24 (d, J = 2.0 Hz, 1H), 7.13 (dd, J = 8.5; 2.0 Hz, 1H), 4.03 (t, J = 7.0 Hz, 2H), 3.86 (s, 3H), 2.30 (s, 3H), 1.82 (m, 2H), 1.47 (m, 2H), 0.96 (t, J = 7.0 Hz, 3H).

E) 1-[3-(Butoxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl)oxime

Following the procedure of Example 1E, from 3-butoxy-4-methoxyacetophenone oxime (8.73 mmol, 1.94 g) and chlorosulfonyl isocyanate (4.63 mmol, 0.655 g; 0.403 mL) in dry tetrahydrofuran (40 mL) is obtained a yellow oil which is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 2% ethyl acetate/methylene chloride, 3) 5% ethyl acetate/methylene chloride). The residue was triturated with a minimum of ethyl ether in hexane and collected by suction to afford the title compound as a white solid. The solid was dried overnight *in vacuo* at 50 °C to provide analytically-pure material (1.14 mmol, 0.306 g; 13%).

NMR (DMSO-d₆, 300 MHz) δ 7.42 (d, J = 2.0 Hz, 1H), 7.34 (dd, J = 8.5, 2.0 Hz, 1H), 7.10 (s, 2H), 6.98 (d, J = 8.5 Hz, 1H), 4.01 (t, 2H), 3.79 (s, 3H), 2.29 (s, 3H), 1.69 (m, 2H), 1.43 (m, 2H), 0.53 (t, 3H).

IR (KBr) (cm⁻¹) 3445, 3250, 2970, 1734, 1605, 1517, 1370, 1257, 1156, 1023, 975.

MS (EI, m/e (%)) 280 (14, M⁺), 237 (100), 181 (99), 164 (65), 150 (48), 125 (37), 124 (94), 79 (30).

Analysis for: C ₁₄ H ₂₀ N ₂ O ₄			
Calculated:	C, 59.99;	H, 7.19;	N, 9.99.
Found:	C, 59.97;	H, 7.10;	N, 9.87.

Example 3

1-[4-Methoxy-3-(3-phenoxypropoxy)phenyl]ethanone (E)-O-(aminocarbonyl)oxime

A) 4-Methoxy-3-(3-phenoxypropoxy)-benzaldehyde

Following the procedure of Example 1A, from isovanillin (20 mmol, 3.04 g), powdered K₂CO₃ (22 mmol, 3.04 g), and 3-phenoxypropylbromide (22 mmol, 4.73 g; 3.47 mL) in dry dimethylformamide (100 mL) is obtained the alkylated product (20.0 mmol, 5.75 g; 100%) as a tan solid of sufficient purity to be used as such.

NMR (DMSO-d₆, 300 MHz): δ 9.84 (s, 1H), 7.56 (dd, J = 8.5; 2.0 Hz, 1H), d 7.44 (d, J = 2.0 Hz, 1H), 7.28 (m, 2H), 7.18 (d, J = 8.5 Hz, 1H), 6.94 (m, 3H), 4.20 (t, J = 7.0 Hz, 2H), 4.13 (t, J = 7.0 Hz, 2H), 3.66 (s, 3H), 2.20 (m, 2H).

B) α -Methyl-4-methoxy-3-(3-phenoxypropoxy)-benzyl alcohol

Following the procedure of Example 1B, from 4-methoxy-3-(3-phenoxypropoxy)benzaldehyde (8.03 mmol, 2.30 g) and methyllithium (12.05 mmol; 8.61 mL; 1.4 M solution in ethyl ether) in dry tetrahydrofuran (100 mL) is obtained the title compound (7.57 mmol, 2.29 g; 94%) as a tan solid.

NMR (DMSO-d₆, 300 MHz) δ 7.30 (m, 2H), 6.90 (m, 6H), 5.02 (d, 1H), 4.63 (m, 1H), 4.12 (t, J = 7.0

Hz, 2H), 4.09 (t, J = 7.0 Hz, 2H), 3.70 (s, 3H), 2.15 (p, 2H), 1.27 (d, 3H).

C) 4-Methoxy-3-(3-phenoxypropoxy)acetophenone

Following the procedure of Example 1C, from α -methyl-4-methoxy-3-(3-phenoxypropoxy)benzyl alcohol (7.51 mmol, 2.27 g) and pyridinium dichromate (11.26 mmol, 4.23 g) in dry methylene chloride (75 mL) is obtained the title compound (7.06 mmol, 2.12 g; 94%) as a light yellow solid of sufficient purity to be used directly in the subsequent transformation.

NMR (DMSO- d_6 , 300 MHz) δ 7.61 (dd, J = 8.5; 2.0 Hz, 1H), 7.46 (d, J = 8.5 Hz, 1H), 7.27 (m, 2H), 7.05 (d, 1H), 6.93 (m, 3H), 4.15 (t, J = 7.0 Hz, 2H), 4.10 (t, J = 7.0 Hz, 2H), 3.80 (s, 3H), 2.48 (s, 3H), 2.18 (m, 2H).

D) 4-Methoxy-3-(3-phenoxypropoxy)acetophenone oxime

Following the procedure of Example 1D, from 4-methoxy-3-(3-phenoxypropoxy)acetophenone (7.06 mmol, 2.12 g) and hydroxylamine hydrochloride (7.76 mmol, 540 mg) in dry pyridine (70 mL) is obtained the title compound as an off-white solid (6.60 mmol; 2.08 g; 93%) of sufficient purity to be used as such in the subsequent transformation.

NMR (DMSO- d_6 , 300 MHz) δ 10.95 (s, 1H), 7.25 (m, 3H), 7.16 (d, J = 2.0 Hz, 1H), 6.93 (m, 4H), 4.12 (t, J = 7.5 Hz, 2H), 4.09 (t, J = 7.5 Hz, 2H), 3.77 (s, 3H), 2.15 (m, 2H), 2.10 (s, 3H).

E) 1-[4-Methoxy-3-(3-phenoxypropoxy)phenyl]ethanone (E)-O-(aminocarbonyl) oxime

Following the procedure of Example 1E, to a slowly-stirred suspension of sodium isocyanate (19.02 mmol, 1.24 g) in dry methylene chloride (20 mL) is added anhydrous trifluoroacetic acid (38.05 mmol, 4.34 g; 2.93 mL) and a solution of 4-methoxy-3-(3-phenoxypropoxy)acetophenone oxime (4.76 mmol, 1.50 g) in methylene chloride (6 mL) to obtain a yellow oil which is purified by flash chromatography (SiO₂: 1) 5% ethyl acetate/methylene chloride, 2) 8% ethyl acetate/methylene chloride, 3) 10% ethyl acetate/methylene chloride). The resulting white solid is dried *in vacuo* to afford analytically pure title compound (3.12 mmol, 1.12 g; 66%).

NMR (DMSO- d_6 , 300 MHz) δ 7.47 (d, J = 2.0 Hz, 1H), 7.36 (dd, J = 8.5; 2.0 Hz, 1H), 7.27 (m, 2H), 7.11 (s, 2H), 6.95 (m, 4H), 4.19 (t, J = 7.0 Hz, 2H), 4.12 (t, J = 7.0 Hz, 2H), 3.78 (s, 3H), 2.28 (s, 3H), 2.16 (t, 2H).

IR (KBr) (cm⁻¹) 3470, 3250, 2940, 1730, 1605, 1590, 1520, 1370, 1258, 1152, 975, 758

MS (EI, m/e (%)) 358 (M⁺, 0.6); 315 (55), 164 (23), 107 (100), 77 (75).

Analysis for: C ₁₉ H ₂₂ N ₂ O ₅			
Calculated:	C, 63.67;	H, 6.19;	N, 7.82.
Found:	C, 64.01;	H, 6.08;	N, 7.71.

Example 4

1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone (E)-O-(aminocarbonyl)oxime

A) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenyl ethan-1-ol

To a magnetically-stirred solution of freshly crushed magnesium turnings (36.54 mmol, 0.888 g) in anhydrous ethyl ether (20 mL) at room temperature is added a solution of benzyl bromide (36.54 mmol, 4.35 mL) in anhydrous ethyl ether (15 mL) dropwise via addition funnel. The addition is slow at first; only 2 to 3 mL of reagent is added and the reaction mixture is heated until gas evolution is observed. Dropwise addition of benzyl bromide is begun at this point, and the reaction mixture is diluted with ethyl ether (20 mL) to prevent dimerization of the Grignard reagent. Once the addition of benzyl bromide is complete, the reaction is allowed to stir at room temperature for 1 hour and then a solution of 3-cyclopentyloxy-4-methoxybenzaldehyde (30.00 mmol, 6.61 g) in anhydrous ethyl ether (30 mL) is added dropwise at room temperature. The reaction mixture is allowed to stir at room temperature for 30 minutes and then poured into a solution of ice water (500 mL) containing concentrated H₂SO₄ (7 mL). The aqueous mixture is extracted with ethyl acetate (2 x 300 mL) and the combined organic layers are washed with saturated NaHCO₃ (300 mL). The organic layer is dried (Na₂SO₄) and concentrated *in vacuo* to afford the title compound as a white solid (25.97 mmol, 8.06 g; 86%) of sufficient purity to be used directly in subsequent transformation.

B) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone

Following the procedure of Example 1C, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenylethan-1-ol (10.0 mmol, 3.12 g) and pyridinium dichromate (15.0 mmol, 5.64 g) in dry methylene chloride (100

mL) is obtained the ketone as a light yellow solid (9.05 mmol, 2.81 g; 90%) of sufficient purity to be used as such in subsequent transformation without purification

NMR (CDCl₃, 300 MHz) δ 7.63 (dd, J = 8.5 Hz; 2.0 Hz, 1H), 7.54 (d, J = 2.0 Hz, 1H), 7.28 (m, 5H), 6.86 (d, J = 8.5 Hz, 1H), 4.80 (m, 1H), 4.22 (s, 2H), 3.89 (s, 3H), 1.80 (m, 8H).

C) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone oxime

Following the procedure of Example 1D, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone (5.0 mmol, 1.55 g) and hydroxylamine hydrochloride (5.50 mmol, .382 g) in dry pyridine (25 mL) is obtained the title compound as a yellow solid (4.61 mmol, 1.50 g, 93%) of sufficient purity to be used as such in the subsequent transformation.

NMR (DMSO-d₆, 300 MHz) δ 11.27 (s, 1H), 7.20 (m, 7H), 6.89 (m, 8H), 4.70 (m, 1H), 4.12 (s, 2H), 3.70 (s, 3H), 1.65 (m, 8H).

D) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone (E)-O-(amino carbonyl)oxime

To a magnetically-stirred solution of 1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenyl ethanone oxime (4.51 mmol, 1.48g) in dry tetrahydrofuran (45 mL) at 0 °C is added trichloroacetyl isocyanate (5.00 mmol, 0.943 mg; 0.596 mL) dropwise over 2 minutes and the resulting solution is allowed to stir as the temperature rises slowly from 0 °C to room temperature overnight. The reaction mixture is then cooled to 0 °C and saturated NH₃/acetonitrile solution (25 mL; prepared by bubbling gaseous ammonia through CH₃CN at room temperature for 1 hour) is added dropwise to the reaction mixture. The solution is allowed to stir as it warms slowly from 0 °C to room temperature. After 1.5 hours, the tetrahydrofuran is removed *in vacuo* and the residue is partitioned between methylene chloride (200 mL) and water (200 mL). The aqueous phase is extracted with ethyl acetate (200 mL) and the combined organics are washed with water (200 mL), dried (Na₂SO₄), and concentrated *in vacuo* to afford a mixture of product and oxime (~1:1). The residue is purified via flash chromatography (SiO₂: 1) 2% ethyl acetate/methylene chloride, 2) 5% ethyl acetate/methylene chloride, 3) 7% ethyl acetate/methylene chloride) to give a white solid which is triturated with ether/hexane and dried *in vacuo* at 50 °C to afford analytically-pure title compound (1.22 mmol, 0.450 g; 27%).

NMR (DMSO-d₆, 300 MHz) δ 7.38 (m, 2H), 7.24 (m, 2H), 7.17 (m, 5H), 6.94 (d, J = 8.5 Hz, 1H), 4.84 (m, 1H), 4.23 (s, 2H), 3.74 (s, 3H), 1.65 (m, 8H).

IR (KBr) (cm⁻¹) 3925, 3815, 3240, 2950, 2920, 1710, 1588, 1511, 1358, 1252, 1222, 1130, 960, 898.

MS (FAB, m/e (%)) 391 (22, M⁺Na⁺), 368 (21, M⁺), 310 (100), 308 (66), 91 (85).

Analysis for: C ₂₁ H ₂₄ N ₂ O ₄			
Calculated:	C, 68.46;	H, 6.57;	N, 7.60.
Found:	C, 68.42;	H, 6.71;	N, 7.48.

Example 5

1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone (E)-O-(aminocarbonyl)oxime

A) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropan-1-ol

Following the procedure of Example 4A, from magnesium turnings (32.42 mmol, 0.788 g), 2-bromoethylbenzene (32.42 mmol, 6.00 g), 3-cyclopentyloxy-4-methoxybenzaldehyde (32.42 mmol, 7.14 g) of Example 1A, and anhydrous ethyl ether (300 mL) is obtained the title compound as a white solid (29.4 mmol, 9.60 g; 91%) which is of sufficient purity to be used directly without further purification.

NMR (DMSO-d₆, 300 MHz) δ 7.21 (m, 5H), 6.89 (d, J = 2.0 Hz, 1H), 6.87 (d, J = 8.5 Hz, 1H), 6.80 (dd, J = 8.5; 2.0 Hz, 1H), 5.12 (d, 1H), 4.76 (m, 1H), 4.42 (m, 1H), 3.70 (s, 3H), 2.58 (m, 2H), 2.73 (m, 10H).

B) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone

Following the procedure of Example 1C, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropan-1-ol (29.41 mmol, 9.60 g) and pyridinium dichromate (44.12 mmol, 16.59 g) in dry methylene chloride (120 mL) is obtained the ketone as a light yellow solid which is shown by TLC to contain a small amount of 3-cyclopentyloxy-4-methoxybenzaldehyde. This material was partitioned between aqueous saturated NaHSO₃ (500 mL) and ethyl acetate (500 mL) to remove traces of aldehyde leftover from the Grignard reaction. The aqueous phase is washed with ethyl acetate (500 mL), and the organic layers are combined, dried (Na₂SO₄), and concentrated *in vacuo* to afford the title compound as a white solid (23.74 mmol, 7.70 g; 89%) in sufficient purity to be used as such without further purification.

NMR (DMSO- d_6 , 300 MHz) δ 7.64 (dd, J = 8.5 Hz; 2.0 Hz, 1H), 7.43 (d, J = 2.0 Hz, 1H), 7.28 (s, 2H), 7.26 (s, 2H), 7.18 (m, 1H), 7.04 (d, J = 8.5 Hz, 1H), 4.82 (m, 1H), 3.80 (s, 3H), 3.30 (t, J = 7.0 Hz, 2H), 2.90 (t, J = 7.0 Hz, 2H), 1.70 (m, 8H).

C) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone oxime

Following the procedure of Example 1D, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone (9.25 mmol, 3.00 g) and hydroxylamine hydrochloride (10.17 mmol, 0.707 g) in anhydrous pyridine (90 mL) is obtained the oxime as a light yellow solid (8.54 mmol, 2.90 g; 92%) which is sufficiently pure to be used as such without further purification.

NMR (DMSO- d_6 , 300 MHz) δ 11.07 (s, 1H), 7.22 (m, 7H), 6.94 (d, J = 8.5 Hz, 1H), 4.75 (m, 1H), 3.75 (s, 3H), 2.94 (t, 2H), 2.73 (t, 2H), 1.70 (m, 8H).

D) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone (E)-O-(amino carbonyl)oxime

Following the alternative procedure to Example 1E, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone oxime (8.54 mmol, 2.90 g) and chlorosulfonyl isocyanate (12.82 mmol, 1.81 g; 1.12 mL) in dry tetrahydrofuran (80 mL) is obtained a yellow oil which is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 2% ethyl acetate/methylene chloride, 3) 5% ethyl acetate/methylene chloride, 4) 10% ethyl acetate/methylene chloride). The residue is triturated with a minimum of ethyl ether in hexane and collected by suction to afford the title compound as a white solid. The solid is dried overnight *in vacuo* at 50 °C to provide analytically-pure material (2.53 mmol, 0.969 g; 30%).

NMR (DMSO- d_6 , 300 MHz) δ 7.26 (m, 7H), 7.07 (s, 2H), 6.99 (d, J = 2.0 Hz, 1H), 4.86 (m, 1H), 3.78 (s, 3H), 3.07 (t, 2H), 2.78 (t, 2H), 1.7 (m, 8H).

IR (KBr) (cm⁻¹) 3480, 3310, 3260, 2940, 1710, 1550, 1515, 1357, 1266, 1218, 1125, 1015, 975, 695

MS (EI, m/e) 382 (0.5, M⁺), 339 (24), 254 (60), 213 (22), 150 (100), 149 (31), 105 (20), 91 (50).

Analysis for: C ₂₂ H ₂₆ N ₂ O ₄			
Calculated:	C, 69.09;	H, 6.85;	N, 7.33.
Found:	C, 68.81;	H, 6.82;	N, 7.04.

Example 6

1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanone (E)-O-(aminocarbonyl)oxime

A) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylbutan-1-ol

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxybenzaldehyde (25.0 mmol, 5.50 g) of Example 1A, in anhydrous ethyl ether (250 mL) at 0 °C is added isobutylmagnesium chloride (30 mmol, 15 mL; 2.0 M solution in ethyl ether) dropwise over 20 minutes. The reaction mixture is allowed to stir while slowly warming to room temperature over 1 hour and is then poured into 1N HCl (250 mL) and partitioned with ethyl ether (200 mL). The aqueous phase is extracted with ethyl ether (200 mL) and the combined organics are washed with aqueous saturated NaHCO₃ (200 mL), aqueous saturated NaCl (200 mL), and dried (MgSO₄). Concentration *in vacuo* affords a yellow oil which is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 2% ethyl acetate/methylene chloride, 3) 5% ethyl acetate/methylene chloride) to give the title compound as a white solid (21.5 mmol, 5.98 g; 86%).

NMR (DMSO- d_6 , 300 MHz) δ 6.82 (m, 3H), 4.93 (d, 1H), 4.76 (m, 1H), 4.43 (m, 1H), 3.68 (s, 3H), 1.60 (m, 8H), 1.30 (m, 2H), 0.85 (d, 6H).

B) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylbutanone

Following the procedure of Example 1C, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylbutan-1-ol (21.5 mmol, 5.98 g) and pyridinium dichromate (33.0 mmol, 12.4 g) in dry methylene chloride (125 mL) is obtained the ketone as a light yellow oil (21.0 mmol, 5.80 g; 98%) of sufficient purity to be used as such in subsequent transformation.

NMR (DMSO- d_6 , 300 MHz) δ 7.56 (dd, J = 8.5; 2.0 Hz, 1H), 7.53 (d, J = 2.0 Hz, 1H), 6.87 (d, J = 8.5 Hz, 1H), 4.85 (m, 1H), 3.93 (s, 3H), 2.79 (d, 2H), 2.30 (m, 1H), 1.80 (m, 8H), 1.00 (d, 6H).

C) 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylbutanone oxime:

Following the procedure of Example 1D, from 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylbutanone (10.0 mmol, 2.76 g) and hydroxylamine hydrochloride (11.0 mmol, 0.765 g) in dry pyridine (50 mL) is obtained the title compound as a colorless oil which solidifies on standing (9.51 mmol, 2.77 g, 95%). This material is of sufficient purity to be used as such in the subsequent transformation.

NMR (DMSO- d_6 , 300 MHz) δ 10.92 (s, 1H), 7.20 (d, J = 2.0 Hz, 1H), 7.13 (dd, J = 8.5; 2.0 Hz, 1H),

6.94 (d, J = 8.5 Hz, 1H), 4.78 (m, 1H), 3.73 (s, 3H), 2.60 (d, 2H), 1.70 (m, 8H), 0.84 (d, 6H).

D) 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanone (E)-O-(amino carbonyl)oxime

Following the procedure of Example 1E, to a slowly stirred suspension of sodium isocyanate (32.0 mmol, 2.08 g) in dry methylene chloride (30 mL) is added anhydrous trifluoroacetic acid (16.0 mmol, 1.82 g; 1.23 mL) and a solution of 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylbutanone oxime (4.0 mmol, 1.16 g) in methylene chloride (10 mL) to afford a yellow oil which is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 1% ethyl acetate/methylene chloride, 3) 3% ethyl acetate/methylene chloride, 4) 6% ethyl acetate/methylene chloride). The residue is triturated overnight with ethyl ether/hexane and dried *in vacuo* at 50 °C to afford analytically pure title compound as a white solid (2.40 mmol, 0.802 g; 60%).

NMR (DMSO-d₆, 300 MHz) δ 7.35 (m, 2H), 7.05 (s, 2H), 6.98 (m, 1H), 4.90 (m, 1H), 3.78 (s, 3H), 2.74 (d, 2H), 1.72 (m, 9H), 0.86 (d, 6H).

IR (KBr) (cm⁻¹) 3440, 3310, 3200, 2956, 2874, 1722, 1618, 1515, 1360, 1260, 990.

MS (EI, m/e (%)) 334 (M⁺, 4), 291 (11), 223 (13), 206 (100), 165 (52), 150 (65), 149 (66)

Analysis for: C ₁₈ H ₂₆ N ₂ O ₄			
Calculated:	C, 64.64;	H, 7.84;	N, 8.38.
Found:	C, 64.97;	H, 7.85;	N, 8.36.

Example 7

1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone (E)-O-[(methylamino)carbonyl]oxime

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxyacetophenone oxime (2.0 mmol, 0.5 g) of Example 1D, in dry tetrahydrofuran (20 mL) at 0 °C is added methyl isocyanate (2.20 mmol, 0.126 g; 0.130 mL) dropwise over 1 minute followed by a catalytic amount of 4-dimethylaminopyridine (4-DMAP). The reaction mixture is allowed to stir while warming slowly from 0 °C to room temperature over 4 hours while being monitored by TLC. After 4 hours, another equivalent of methyl isocyanate (0.130 mL) is added at room temperature and the reaction is allowed to stir overnight. The tetrahydrofuran is removed *in vacuo* and the residue is partitioned between methylene chloride (100 mL) and water (100 mL). The aqueous phase is extracted with methylene chloride (100 mL) and the combined organics are washed with water (100 mL), dried (Na₂SO₄), and concentrated *in vacuo*. The residue is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 2% ethyl acetate/methylene chloride, 3) 5% ethyl acetate/methylene chloride) and triturated with hexane to give title compound as a white solid which is dried overnight *in vacuo* at 50 °C to provide analytically-pure material (1.58 mmol, 0.493 g; 80%).

NMR (DMSO-d₆, 300 MHz) δ 7.39 (dd, J = 8.5, 2.0 Hz, 1H), 7.37 (d, J = 2.0 Hz, 1H), 6.99 (d, J = 8.5 Hz, 1H), 4.90 (m, 1H), 3.77 (s, 3H), 2.70 (d, 2H), 2.29 (s, 3H), 1.70 (m, 8H).

IR (KBr) (cm⁻¹) 3575, 3408, 2960, 1714, 1500, 1427, 1280, 1253, 1233, 1150, 958.

MS (EI, m/e (%)) 306 (20, M⁺), 249 (9), 216 (19), 185 (19), 181 (100), 164 (20), 86 (43), 84 (65).

Analysis for: C ₁₆ H ₂₂ N ₂ O ₄			
Calculated:	C, 62.73;	H, 7.24;	N, 9.14.
Found:	C, 62.60;	H, 7.28;	N, 9.15.

Example 8

1-(3-butoxy-4-methoxyphenyl)ethanone (E)-O-[(methylamino)carbonyl]oxime

Following the procedure of Example 7, from 3-butoxy-4-methoxyacetophenone oxime (2.10 mmol, 0.498 g) of Example 2D, and methyl isocyanate (3.46 mmol, 0.198 g; 0.204 mL) in dry tetrahydrofuran (20 mL) containing a catalytic amount of 4-dimethylaminopyridine is obtained a yellow oil which is purified by flash chromatography (SiO₂: 1) methylene chloride, 2) 2% ethyl acetate/methylene chloride). Trituration with hexane and collection via suction affords title compound as a white solid which is dried overnight *in vacuo*

at 50 °C to provide analytically-pure material. (1.46 mmol, 0.430 g; 70%)

NMR (DMSO- d_6 , 300 MHz) δ 7.40 (m, 3H), 6.99 (d, J = 8.5 Hz, 1H), 4.01 (t, 2H), 3.79 (s, 3H), 2.70 (d, J = 3.5 Hz, 2H), 2.30 (s, 3H), 1.69 (m, 2H), 1.42 (m, 2H), 0.93 (t, 3H).

IR (KBr) (cm^{-1}) 3355, 2970, 2950, 2883, 1717, 1520, 1464, 1332, 1266, 1234, 1152, 1033, 960.

MS (EI, m/e (%)) 294 (31, M^+), 150 (56), 149 (30), 148 (23), 237 (100), 181 (79), 180 (30), 165 (40), 164 (48), 140 (42), 135 (29), 125 (30), 124 (56), 79 (34).

Analysis for: $C_{15}H_{22}N_2O$			
Calculated:	C, 61.21;	H, 7.53;	N, 9.52.
Found:	C, 60.58;	H, 7.56;	N, 9.41.

Example 9

1-(3-butoxy-4-methoxyphenyl)ethanone (E)-O-[(phenylamino)carbonyl]oxime

Following the procedure of Example 7, from 3-butoxy-4-methoxyacetophenone oxime (1.50 mmol, 0.356 g) of Example 2D, and phenyl isocyanate (1.65 mmol, 0.196 g, 0.179 mL) in dry tetrahydrofuran (15 mL) containing a catalytic amount of 4-dimethylaminopyridine is obtained a yellow oil which is purified by flash chromatography (SiO₂: 1) 2:1 methylene chloride/hexane, 2) methylene chloride). Trituration with hexane affords a white solid which is collected by suction and dried *in vacuo* overnight at 50 °C to provide analytically-pure title compound (0.97 mmol, 0.347 g; 65%).

NMR (DMSO- d_6 , 300 MHz) δ 9.78 (s, 1H), 7.53 (dd, J = 8.5; 2.0 Hz, 2H), 7.34 (m, 4H), 7.04 (m, 2H), 4.00 (t, 2H), 3.81 (s, 3H), 2.48 (s, 3H), 1.70 (m, 2H), 1.44 (m, 2H), 0.93 (t, 3H).

IR (KBr) (cm^{-1}) 3270, 3140, 3080, 2985, 2965, 1734, 1600, 1552, 1517, 1444, 1320, 1250, 1230, 1210, 1165, 1015, 765.

MS (FAB, m/e (%)) 356 (20, M^+), 328 (7), 312 (21), 222 (52), 220 (100), 164 (5), 123 (8).

Analysis for: $C_{20}H_{24}N_2O_4$			
Calculated:	C, 67.40;	H, 6.79;	N, 7.86.
Found:	C, 67.53;	H, 6.59;	N, 7.96.

Example 10

1-[3-(cyclopentyloxy)-4-methoxyphenyl]ethanone (E)-O-(methoxycarbonyl)oxime

To a magnetically-stirred solution of 3-cyclopentyloxy-4-methoxyacetophenone oxime (1.90 mmol, 0.474 g) of Example 1D, in dry methylene chloride (20 mL) at 0 °C is added pyridine (3.42 mmol, 0.271 g; 0.277 mL) followed by the dropwise addition of methyl chloroformate (2.28 mmol, 0.215 g; 0.176 mL). The resulting yellow solution is stirred while warming slowly to room temperature over 5 hours. The reaction mixture is diluted with methylene chloride (100 mL) and partitioned with water (100 mL). The aqueous phase is extracted with methylene chloride (100 mL) and the combined organic layers are washed with water (100 mL). The organics are dried (Na₂SO₄) and concentrated *in vacuo* to give a yellow solid which is subsequently triturated with a minimum of ethyl ether in hexane and collected by suction to afford the title compound as a white solid. The solid is dried overnight *in vacuo* at 50 °C to provide analytically-pure material (1.19 mmol, 0.365 g; 62.5%).

NMR (DMSO- d_6 , 300 MHz) δ 7.30 (dd, J = 8.5, 2.0 Hz, 1H), 7.28 (d, J = 2.0 Hz, 1H), 7.02 (d, J = 8.5 Hz, 1H), 4.80 (m, 1H), 3.81 (s, 3H), 3.78 (s, 3H), 2.30 (s, 3H), 1.70 (m, 8H).

IR (KBr) (cm^{-1}) 2970, 1790, 1580, 1510, 1540, 1525, 1248, 1150, 1020, 988, 844, 778.

MS (EI, m/e (%)) 307 (27, M^+), 239 (54), 165 (35), 164 (81), 148 (100), 123 (32), 122 (55).

Analysis for: C ₁₅ H ₂₁ NO ₅			
Calculated:	C, 62.52;	H, 6.89;	N, 4.56.
Found:	C, 62.49;	H, 6.72;	N, 4.49.

5

Example 11**1-(3-butoxy-4-methoxyphenyl)ethanone (E)-O-(methoxycarbonyl)oxime**

10

Following the procedure of Example 10, from 3-butoxy-4-methoxyacetophenone oxime (1.80 mmol, 0.427 g) of Example 2D, pyridine (2.0 mmol, 0.158 g; 0.162 mL), and methyl chloroformate (2.0 mmol, 0.189 g; 0.154 mL) in dry methylene chloride (20 mL) is obtained an off-white solid which is purified by flash chromatography (SiO₂: 1) 2:1 methylene chloride/hexane, 2) 4:1 methylene chloride/hexane, 3) methylene chloride). The resulting material is dried overnight *in vacuo* at 50 °C to provide analytically-pure title compound as a white solid (1.59 mmol, 0.470 g; 88%).

15

NMR (DMSO-d₆, 300 MHz) δ 7.30 (dd, J = 8.5, 2.0 Hz, 1H), 7.28 (d, J = 2.0 Hz, 1H), 7.02 (d, J = 8.5 Hz, 1H), 3.87 (t, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 2.31 (s, 3H), 1.70 (m, 2H), 1.44 (m, 2H), 0.93 (m, 3H).

20

IR (KBr) (cm⁻¹) 3400, 2970, 2950, 1785, 1520, 1442, 1430, 1317, 1245, 1152, 1020, 938, 878, 783.

MS (EI, m/e (%)) 295 (51, M⁺), 220 (26), 164 (64), 149 (33), 148 (100), 134 (34), 123 (37), 122 (54), 79 (34).

Analysis for: C ₁₅ H ₂₁ NO ₅			
Calculated:	C, 61.00;	H, 7.17;	N, 4.74.
Found:	C, 60.99;	H, 7.23;	N, 4.76.

25

Example 12

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1-(3-butoxy-4-methoxyphenyl)ethanone (E)-O-(phenoxycarbonyl)oxime

Following the procedure of Example 10, from 3-butoxy-4-methoxyacetophenone oxime (1.50 mmol, 0.356 g) of Example 2D, pyridine (1.65 mmol, 0.130 g; 0.133 mL), and phenyl chloroformate (1.65 mmol, 0.258 g; 0.207 mL) in dry methylene chloride (15 mL) is obtained a yellow oil which is purified by flash chromatography (SiO₂: 1) 1:1 methylene chloride/hexane, 2) 2:1 methylene chloride/hexane). Subsequent trituration with a minimum of ethyl ether in hexane gives title compound as a white solid which is dried overnight *in vacuo* at 50 °C to provide analytically-pure material (0.42 mmol, 0.150 g; 28%).

35

NMR (DMSO-d₆, 300 MHz) δ 7.47 (m, 2H), 7.33 (m, 5H), 7.05 (d, J = 8.5 Hz, 1H), 3.98 (t, 2H), 3.81 (s, 3H), 2.40 (s, 3H), 1.70 (m, 2H), 1.43 (m, 2H), 0.93 (t, 3H).

40

IR (KBr) (cm⁻¹) 3440, 2960, 2930, 2850, 1790, 1600, 1523, 1330, 1260, 1220, 1180, 1140, 1020.

MS (EI, m/e (%)) 357 (9.1, M⁺), 221 (24), 220 (100), 165 (19), 150 (17), 123 (18), 94 (19).

Analysis for: C ₂₀ H ₂₃ NO ₅			
Calculated:	C, 67.21;	H, 6.49;	N, 3.92.
Found:	C, 65.35;	H, 6.54;	N, 3.77.

45

50

Example 13**1-[3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]-ethanone (E)-O-(aminocarbonyl)oxime**

55

A) 3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxybenzaldehyde

To a magnetically-stirred solution of isovanillin (10 mmol, 1.52 g) in dry tetrahydrofuran (15 mL) at -10 °C is added *endo*-norborneol (10 mmol, 1.12 g) followed by triphenylphosphine (14 mmol, 3.67 g). After a few minutes, a solution of diethylazodicarboxylate (14 mmol, 2.44 g; 2.22 mL) in dry

tetrahydrofuran (5 mL) is added dropwise at -10 °C and the resulting solution is allowed to warm to room temperature over 20 hours. The solvent is removed *in vacuo* and the residue partitioned between ethyl acetate and water. The organic phase is dried (Na₂SO₄) and concentrated *in vacuo* to afford the crude product. This material is purified by flash chromatography (SiO₂: 20% ethyl acetate / hexane) to give the

title compound as a colorless oil (4.07 mmol, 1.00 g; 41%).
NMR (DMSO-d₆, 300 MHz): δ 9.82 (s, 1H), 7.55 (dd, J = 8.5, 2.0 Hz, 1H), 7.30 (d, J = 2.0 Hz, 1H), 7.18 (d, J = 8.5 Hz, 1H), 4.30 (d, J = 5.0 Hz, 1H), 3.85 (s, 3H), 2.38 (d, J = 5.0 Hz, 1H), 2.29 (s, 1H), 1.80 (m, 1H), 1.48 (m, 4H), 1.16 (m, 3H).

B) α-Methyl-3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxybenzyl alcohol

Following the procedure of Example 1B, from 3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxybenzaldehyde (8.53 mmol, 2.10 g) and methyllithium (25.58 mmol, 18.28 mL; 1.4 M solution in ethyl ether) in dry tetrahydrofuran (80 mL) is obtained the crude alcohol. This material is purified by chromatography (SiO₂: methylene chloride) to give the title compound as a colorless oil (4.15 mmol, 1.09 g; 49%).

NMR (CDCl₃, 300 MHz) δ 6.85 (m, 3H), 4.81 (q, 1H), 4.20 (d, J = 5.0 Hz, 1H), 3.81 (s, 3H), 2.50 (d, J = 5.0 Hz, 1H), 2.30 (s, 1H), 1.75 (m, 3H), 1.55 (m, 3H), 1.46 (d, 3H), 1.15 (m, 3H).

C) 3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone

Following the procedure of Example 1C, from α-methyl-3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxybenzyl alcohol (4.15 mmol, 1.09 g) and pyridinium dichromate (6.23 mmol, 2.34 g) in dry methylene chloride (50 mL) is obtained the ketone (3.42 mmol, 0.890 g; 82%) as a white solid of sufficient purity to be used as such without further purification.

NMR (DMSO-d₆, 300 MHz) δ 7.60 (dd, J = 8.5 Hz; 2.0 Hz, 1H), 7.27 (d, J = 2.0 Hz, 1H), 7.02 (d, J = 8.5 Hz, 1H), 4.25 (d, J = 5.0 Hz, 1H), 3.80 (s, 3H), 2.50 (s, 3H), 2.35 (d, J = 5.0 Hz, 1H), 2.25 (s, 1H), 1.85 (m, 1H), 1.45 (m, 4H), 1.13 (m, 3H).

D) 3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone oxime

Following the procedure of Example 1D, from 3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone (3.42 mmol, 0.890 g) and hydroxylamine hydrochloride (3.76 mmol, 0.261 g) in dry pyridine (40 mL) is obtained the acetophenone oxime as a light yellow solid (3.01 mmol, 0.830 g; 88%) of sufficient purity to be used without further purification.

NMR (DMSO-d₆, 300 MHz) δ 11.0 (s, 1H), 7.20 (d, J = 2.0 Hz, 1H), 7.14 (dd, J = 8.5; 2.0 Hz, 1H), 6.93 (d, J = 8.5 Hz, 1H), 4.20 (d, J = 5.0 Hz, 1H), 3.75 (s, 3H), 2.35 (d, J = 5.0 Hz, 1H), 2.25 (s, 1H), 2.10 (s, 3H), 1.71 (m, 1H), 1.50 (m, 4H), 1.15 (m, 3H).

E) 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]ethanone (E)-O-(aminocarbonyl)oxime

Following the procedure of Example 1E, to a slowly-stirred suspension of NaOCN (16.56 mmol, 1.08 g) in dry methylene chloride (20 mL) is added anhydrous trifluoroacetic acid (33.05 mmol, 3.78 g; 2.55 mL) and a solution of 3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone oxime (4.14 mmol, 1.14 g) in methylene chloride (20 mL) to obtain a yellow oil which is purified by flash chromatography (SiO₂: 1) 5% ethyl acetate / methylene chloride, 2) 8% ethyl acetate / methylene chloride, 3) 10% ethyl acetate / methylene chloride). The resulting white solid is dried *in vacuo* to afford analytically pure title compound (0.99 mmol, 0.316 g; 24%).

NMR (DMSO-d₆, 300 MHz) δ 7.35 (dd, J = 8.5; 2.0 Hz, 1H), 7.34 (d, J = 2.0 Hz, 1H), 7.08 (s, 2H), 6.98 (d, J = 8.5 Hz, 1H), 4.36 (d, J = 5.0 Hz, 1H), 3.79 (s, 3H), 2.32 (d, J = 5.0 Hz, 1H), 2.29 (s, 3H), 2.26 (s, 1H), 1.74 (m, 1H), 1.59 (d, 1H), 1.43 (m, 3H), 1.33 (m, 3H).

IR (KBr) (cm⁻¹) 3480, 3280, 3220, 2950, 1750, 1720, 1515, 1350, 1252, 1140, 1000, 975.

MS (EI, m/e (%)) 318 (M⁺, 10), 277 (17), 276 (100), 258 (99), 181 (14)

Analysis for: C₁₇H₂₂N₂O₄

Calculated:	C, 64.13;	H, 6.97;	N, 8.80.
Found:	C, 63.96;	H, 6.67;	N, 8.66.

Example 14

The following assay is employed to assess the ability of the compounds of the invention to inhibit PDE IV.

A solution containing PDE IV is prepared from canine tracheal muscle as follows:

The dog is euthanized with an overdose of beuthanasia while under anesthesia induced by a 33 mg/kg IV bolus of Nembutal. The trachealis muscle is removed, cleaned of connective tissue, and minced

thoroughly. Three to four grams of tissue is then homogenized in Tris-HCl buffer (pH 7.8) using a Polytron. The homogenate is then centrifuged at 25,000 x g (4 °C) for 30 minutes. The supernatant is decanted and filtered through four layers of gauze, and applied to a 40 cm x 2 cm DEAE-Sepharose column that is equilibrated with Tris-HCl buffer (pH 7.8). The column is then washed with an additional 240 mL of buffer to remove unbound proteins. PDE is eluted using 450 mL of Tris-HCl buffer containing a linear gradient of 0.0 - 1.0 M Na-acetate (80 mL/hr), and 7.5 mL fractions are collected. Each fraction is assayed for cAMP and cGMP- metabolizing PDE activity. Fractions eluting at approximately 0.6 M Na-acetate, and containing cAMP but not cGMP metabolic activity are pooled and used as a PDE stock solution for assaying PDE IV inhibitory activity.

PDE IV activity is assayed [as described in Thompson et al., Advances in Cyclic Nucleotide

10,

Research, 69 (1979)] at 30 °C in a reaction mixture containing: 10 mM Tris-HCl (pH 7.8), 5 mM MgCl₂, 1 mM β-mercaptoethanol, 1 μM ³H-cAMP, 10 μM CI-930, PDE IV stock solution, and the desired concentration of test compound. CI-930 is included as an inhibitor of the cyclic GMP-sensitive, cyclic AMP-selective PDE (PDE III) that is also present in the PDE IV stock solution when prepared as described above. The ability of a test compound to inhibit PDE IV is determined by measuring the reduction in cAMP metabolism produced by the test compound and expressing it as a percentage of the reduction induced by 10 μM rolipram, a potent inhibitor of PDE IV [see Beavo, Advances in Second Messenger and Phosphoprotein Research,

22,

(1988)]. IC₅₀s are calculated for each test compound as the concentration of test compound that inhibits PDE IV by 50%.

When tested in this assay, the compounds of the invention give the following results.

Table 1

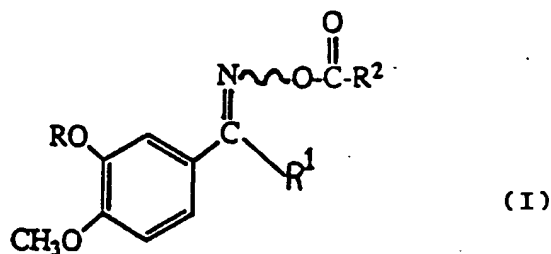
Compound of Example No.	IC ₅₀ of PDE IV
1	4.8 x 10 ⁻⁸
2	9.0 x 10 ⁻⁸
3	4.1 x 10 ⁻⁷
4	4.7 x 10 ⁻⁸
5	2.5 x 10 ⁻⁸
6	1.3 x 10 ⁻⁷
7	1.2 x 10 ⁻⁷
8	2.0 x 10 ⁻⁷
9	1.5 x 10 ⁻⁶
10	1.8 x 10 ⁻⁷
11	2.4 x 10 ⁻⁷
12	3.8 x 10 ⁻⁷
13	6.7 x 10 ⁻⁸

The compounds tested in this assay exhibit significant activity in inhibiting PDE IV.

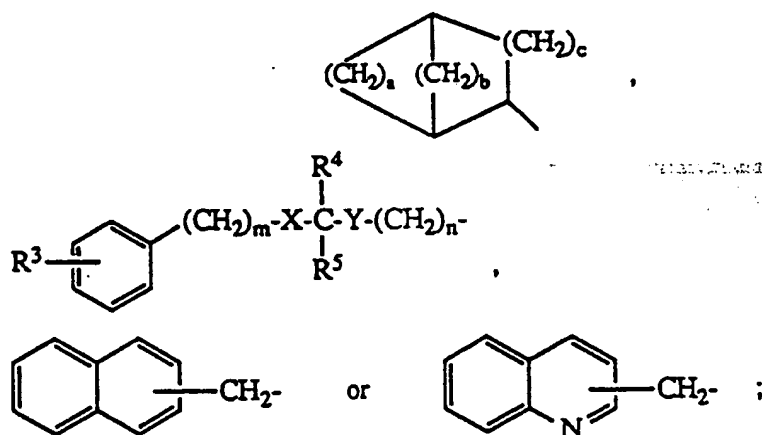
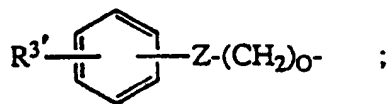
Claims

Claims for the following Contracting States : AT, BE, CH, DE, DK, FR, IT, LI, LU, NL, SE

1. A compound of the formula



wherein

R is C₃₋₇ alkyl, C₃₋₇ cycloalkyl,R¹ is hydrogen, C₁-C₆ alkyl or

a is 1-3;

b is 1-3;

c is 0-2;

X, Y and Z are each independently, a bond, O, S or NH, with the proviso that if one of X or Y is O, S or NH, the other must be a bond;

R² is amino, C₁-C₆ alkylamino, arylamino, C₁-C₆ alkoxy or aryloxy;R³ and R^{3'} are independently hydrogen, halo, hydroxy, C₁-C₆ alkoxy, aryloxy, C₂-C₇ alkanoyloxy, amino, C₁-C₆ alkylamino, arylamino or C₂-C₇ alkanoylamino;R⁴ and R⁵ are each independently hydrogen or C₁-C₆ alkyl;

m is 0-4;

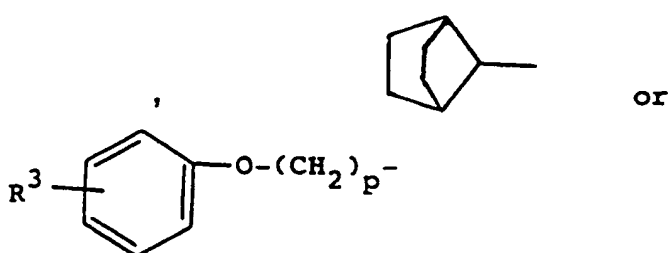
n is 1-4; and

o is 1-4.

2. A compound as claimed in Claim 1 wherein R is C₃₋₇ alkyl, C₃₋₇ cycloalkyl,

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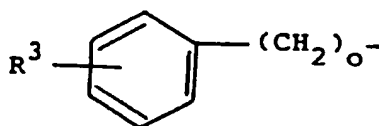


15

wherein R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and p is 2-4.

3. A compound as claimed in Claim 1 or Claim 2 wherein R¹ is hydrogen, C₁₋₆ alkyl or

20



25

where R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and o is 1-4.

4. A compound as claimed in any one of Claims 1 to 3 wherein R² is NH₂.

30

5. A compound as claimed in Claim 1 which is one of the following:

35

- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
- 1-[3-(Butoxy)-4-methoxyphenyl]ethanone(E)-O-(aminocarbonyl)oxime;
- 1-[4-Methoxy-3-(3-phenoxypropoxy)phenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone(E)-O-(aminocarbonyl)oxime;
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone(E)-O-(aminocarbonyl)oxime;
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanone (E)-O-(aminocarbonyl)oxime;
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-[(methylamino)carbonyl]oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-[(methylamino)carbonyl]oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-[(phenylamino)carbonyl]oxime;
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(methoxycarbonyl)oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-(methoxycarbonyl)oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-(phenoxy carbonyl)oxime;
- and
- 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]-ethanone(E)-O-(aminocarbonyl)oxime.

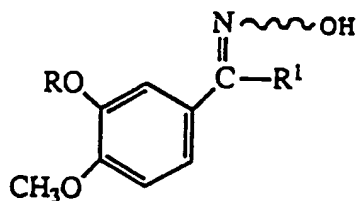
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6. A process for preparing a compound of formula I as defined in Claim 1 which comprises one of the following:

50

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a) carbamoylating an oxime of formula

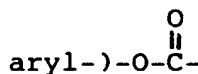


(III)

15 wherein R and R¹ are as defined in Claim 1 using an appropriate isocyanate carbamoylating agent to give a compound of Formula I wherein R² is amino, C₁-C₆ alkylamino or arylamino;

or

b) carbonating an oxime of formula III as defined above using a carbonating agent containing a (C₁-C₆ alkyl- or



moieties to give a compound of formula I wherein R² is C₁-C₆ alkoxy or aryloxy.

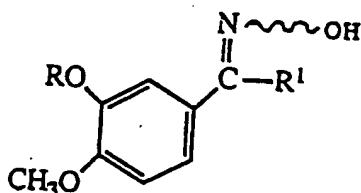
7. A process (a) as claimed in Claim 6 wherein the carbamoylating agent is sodium cyanate, chlorosulfonylisocyanate, trichloroacetyl isocyanate or C₁-C₆ alkyl- or aryl- isocyanate.

30 8. A process (b) as claimed in Claim 6 wherein the carbonating agent is a C₁-C₆ alkyl- or arylchloroformate.

9. A compound of formula I as defined in any one of Claims 1 to 5 for use as a pharmaceutical.

35 10. A pharmaceutical composition comprising a compound of formula I as defined in any one of Claims 1 to 5 and a pharmaceutically acceptable carrier.

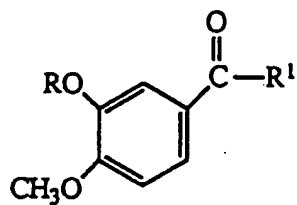
11. A compound of formula III



III

50 wherein R and R¹ are as defined in any one of Claims 1 to 3, with the proviso that when R¹ is hydrogen then R is other than C₃-C₇ alkyl.

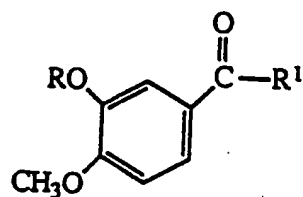
55 12. A process for preparing a compound of formula III as defined in Claim 11 which comprises oximation of a corresponding compound of formula II



(II)

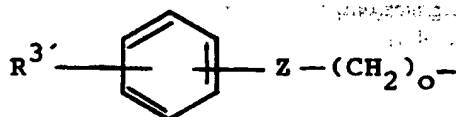
wherein R and R¹ are as defined in Claim 11

13. A compound of formula II



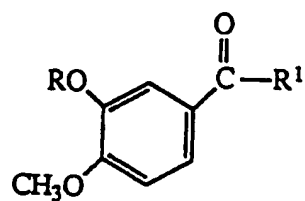
(II)

wherein R¹ is



where R^{3'}, Z and o are as defined in Claim 1 and R is as defined in Claim 1.

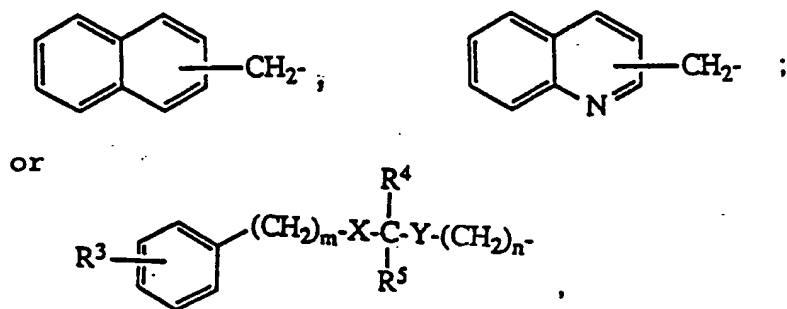
14. A compound of formula II



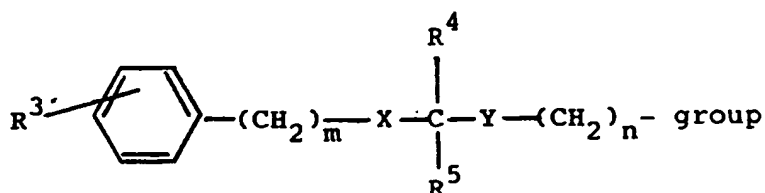
(II)

wherein

a) R¹ is C₁-C₄ alkyl and R is



where R³, m, X, Y, R⁴, R⁵ and n are as defined in Claim 1 providing that the



has more than 8 carbon atoms when X and Y are both bonds, and further providing that R is other than PhCH₂OCH₂-when R¹ is methyl, or

b) R¹ is alkyl wherein the number of carbon atoms is greater than 4 and not more than 6 and R is as defined in Claim 1.

15. A process for preparing a ketone of formula II as defined in Claim 13 or Claim 14 which comprises oxidising a corresponding alcohol.

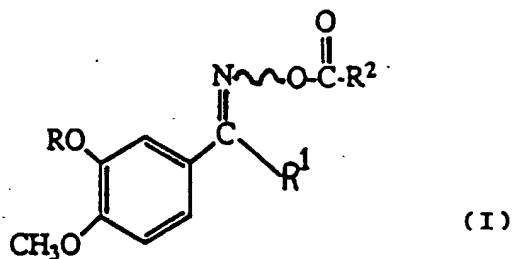
35 16. A compound of formula III as claimed in Claim 11 which is one of the following:

- 3-cyclopentyloxy-4-methoxyacetophenone oxime,
 3-butoxy-4-methoxyacetophenone oxime,
 4-methoxy-3-(3-phenoxypropoxy)acetophenone oxime,
 1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone oxime,
 40 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone oxime,
 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylpropanone oxime or
 3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone oxime.

45 17. A compound of formula II as claimed in Claim 14 which is 4-methoxy-3-(3-phenoxypropoxy)-acetophenone.

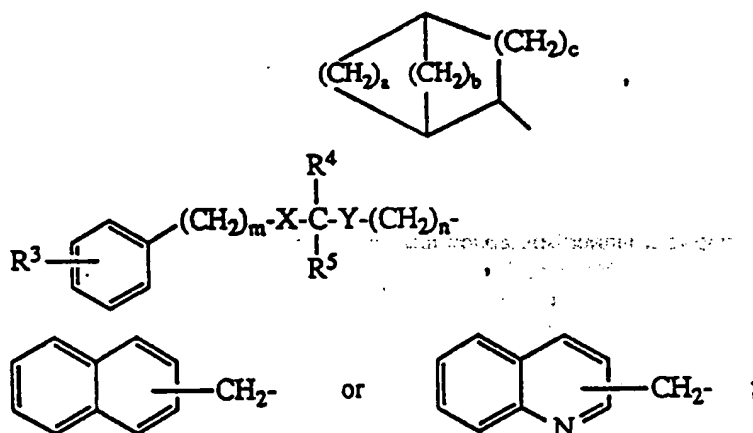
Claims for the following Contracting State : ES

1. A process for preparing a compound of the formula

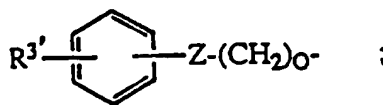


15 wherein

R is C₃₋₇ alkyl, C₃₋₇ cycloalkyl,



R¹ is hydrogen, C₁-C₆ alkyl or



45 a is 1-3;

b is 1-3;

c is 0-2;

X, Y and Z are each independently, a bond, O, S or NH, with the proviso that if one of X or Y is O, S or NH, the other must be a bond;

R² is amino, C₁-C₆ alkylamino, arylamino, C₁-C₆ alkoxy or aryloxy;

50 R³ and R^{3'} are independently hydrogen, halo, hydroxy, C₁-C₆ alkoxy, aryloxy, C₂-C₇ alkanoyloxy, amino, C₁-C₆ alkylamino, arylamino, C₂-C₇ alkanoylamino;

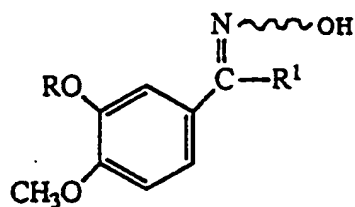
R⁴ and R⁵ are each independently hydrogen or C₁-C₆ alkyl;

m is 0-4;

n is 1-4; and

55 o is 1-4, which comprises one of the following:

a) carbamoylating an oxime of formula

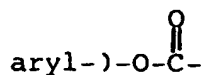


(III)

wherein R and R¹ are as defined above using an appropriate isocyanate carbamoylating agent to give a compound of Formula I wherein R² is amino, C₁-C₆ alkylamino or arylamino;

or

b) carbonating an oxime of formula III as defined above using a carbonating agent containing a (C₁-C₆ alkyl- or

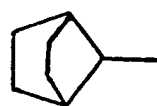
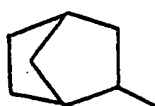


moiety to give a compound of formula I wherein R² is C₁-C₆ alkoxy or aryloxy.

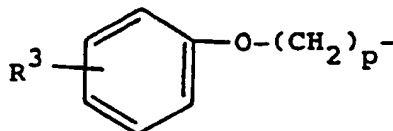
2. A process (a) as claimed in Claim 1 wherein the carbamoylating agent is sodium cyanate, chlorosulfonylisocyanate, trichloroacetyl isocyanate or C₁-C₆ alkyl- or aryl- isocyanate.

3. A process (b) as claimed in Claim 1 wherein the carbonating agent is a C₁-C₆ alkyl- or arylchloroformate.

4. A process as claimed in any one of Claims 1-3 wherein R is C₃-7 alkyl, C₃-7 cycloalkyl,

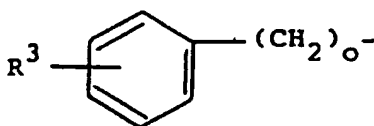


or



wherein R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and p is 2-4.

5. A process as claimed in any one of Claims 1 to 4 wherein R¹ is hydrogen, C₁-C₆ alkyl or



where R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and o is 1-4.

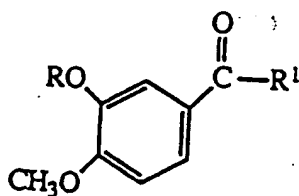
6. A process as claimed in any one of Claims 1 to 5 wherein R² is NH₂.

7. A process as claimed in any one of Claims 1 to 5 in which the product is one of the following:

- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
- 1-[3-(Butoxy)-4-methoxyphenyl]ethanone(E)-O-(aminocarbonyl)oxime;
- 1-[4-Methoxy-3-(3-phenoxypropoxy)phenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone(E)-O-(aminocarbonyl)oxime;
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone(E)-O-(aminocarbonyl)oxime;
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanone (E)-O-(aminocarbonyl)oxime;
- 1-[3-Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-[(methylamino)carbonyl]oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-[(methylamino)carbonyl]oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-[(phenylamino)carbonyl]oxime;
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(methoxycarbonyl)oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-(methoxycarbonyl)oxime;
- 1-(3-Butoxy-4-methoxyphenyl)ethanone(E)-O-(phenoxy carbonyl)oxime;
- and
- 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]ethanone(E)-O-(aminocarbonyl)oxime.

8. A process for preparing a pharmaceutical composition which comprises bringing a compound of formula I as defined in Claim 1 into association with a pharmaceutically acceptable carrier.

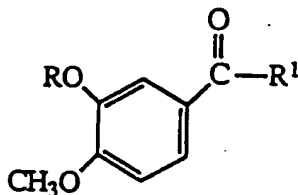
9. A process for preparing an oxime of formula III as defined in Claim 1 with the proviso that when R¹ is hydrogen then R is other than C₃-C₇ alkyl which comprises oximation of a corresponding compound of formula II



(II)

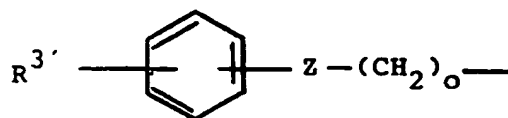
wherein R and R¹ are as defined above.

10. A process for preparing a compound of formula II



(II)

wherein R¹ is

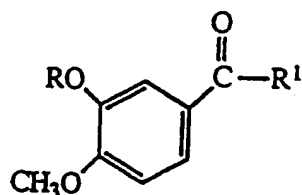


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where $R^{3'}$, Z and o are as defined in Claim 1 and R is as defined in Claim 1 which comprises oxidising a corresponding alcohol.

11. A process for preparing a compound of formula II

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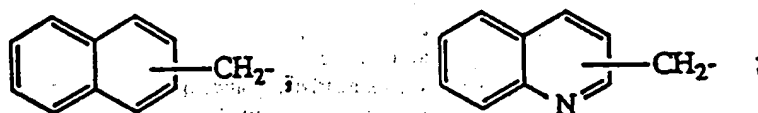


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(II)

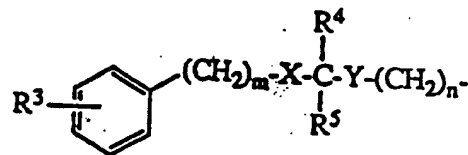
wherein a) R^1 is C_1 - C_4 alkyl and R is

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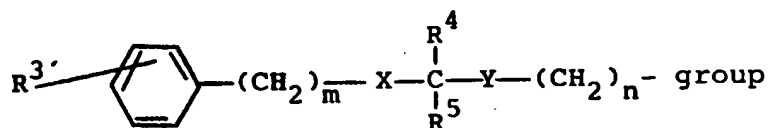
or



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where $R^{3'}$, m, X, Y, R^4 , R^5 and n are as defined in Claim 1 providing that the

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has more than 8 carbon atoms when X and Y are both bonds, and further providing that R is other than $\text{PhCH}_2\text{OCH}_2$ - when R^1 is methyl,

or

b) R^1 is alkyl wherein the number of carbon atoms is greater than 4 and not more than 6 and R is as defined in Claim 1 which comprises oxidising a corresponding alcohol.

50

12. A process as claimed in Claim 9 in which the oxime of formula III prepared is one of the following:

3-cyclopentyloxy-4-methoxyacetophenone oxime,

3-butoxy-4-methoxyacetophenone oxime,

4-methoxy-3-(3-phenoxypropoxy)acetophenone oxime,

55

1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone oxime,

1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone oxime,

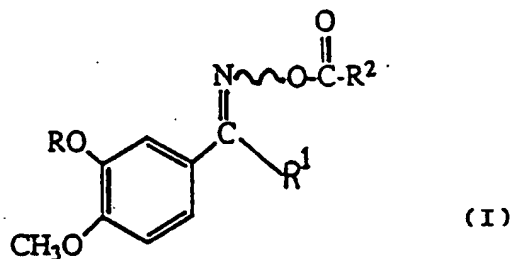
1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylpropanone oxime or

3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone oxime.

13. A process as claimed in Claim 11 in which the compound of formula II prepared is 4-methoxy-3-(3-phenoxypropoxy)acetophenone.

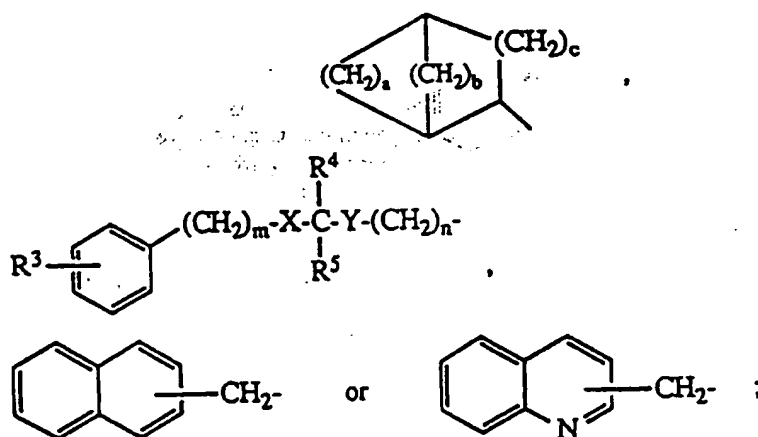
Claims for the following Contracting State : GR

1. A process for preparing a compound of the formula

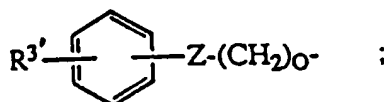


wherein

R is C₃₋₇ alkyl, C₃₋₇ cycloalkyl,



R¹ is hydrogen, C₁₋₆ alkyl or



a is 1-3;

b is 1-3;

c is 0-2;

X, Y and Z are each independently, a bond, O, S or NH, with the proviso that if one of X or Y is O, S or NH, the other must be a bond;

R² is amino, C₁₋₆ alkylamino, arylamino, C₁₋₆ alkoxy or aryloxy;

R³ and R^{3'} are independently is hydrogen, halo, hydroxy, C₁₋₆ alkoxy, aryloxy, C₂₋₇ alkanoyloxy,

amino, C₁₋₆ alkylamino, arylamino or C₂₋₇ alkanoylamino;

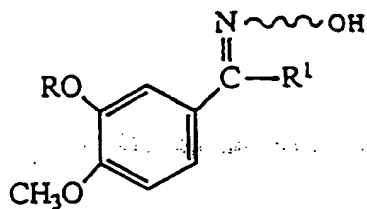
R⁴ and R⁵ are each independently hydrogen or C₁₋₆ alkyl;

m is 0-4;

n is 1-4; and

o is 1-4; which comprises one of the following

a) carbamoylating an oxime of formula

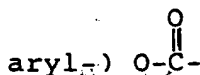


(III)

wherein R and R¹ are as defined above using an appropriate isocyanate carbamoylating agent to give a compound of Formula I wherein R² is amino, C₁-C₆ alkylamino or arylamino;

or

b) carbonating an oxime of formula II as defined above using a carbonating agent containing a (C₁-C₆ alkyl- or

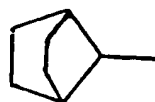
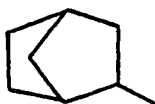


moiety to give a compound of formula I wherein R² is C₁-C₆ alkoxy or aryloxy.

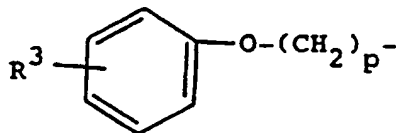
2. A process (a) as claimed in Claim 1 wherein the carbamoylating agent is sodium cyanate, chlorosulfonylisocyanate, trichloroacetyl isocyanate or C₁-C₆ alkyl- or aryl- isocyanate.

3. A process (b) as claimed in Claim 1 wherein the carbonating agent is a C₁-C₆ alkyl- or arylchloroformate.

4. A process as claimed in any one of Claims 1-3 wherein R is C₃-7 alkyl, C₃-7 cycloalkyl,

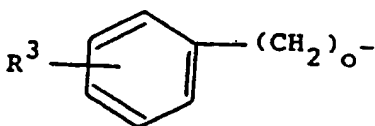


or



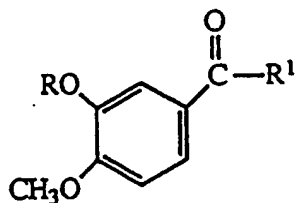
wherein R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and p is 2-4.

5. A process as claimed in any one of Claims 1 to 4 wherein R¹ is hydrogen, C₁-C₆ alkyl or



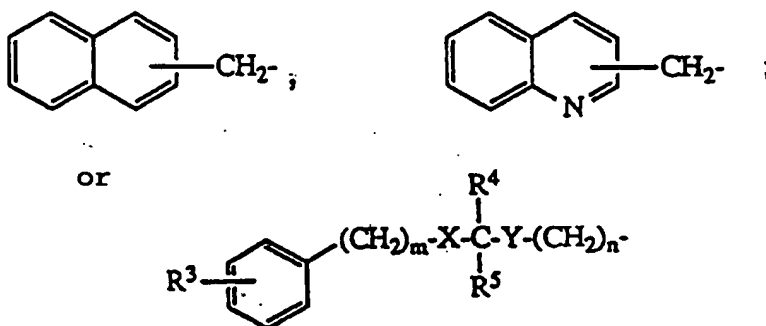
where R³ is hydrogen, halo, hydroxy, acetoxy, amino or acetamido and o is 1-4.

6. A process as claimed in any one of Claims 1 to 5 wherein R² is NH₂.
7. A process as claimed in any one of Claims 1 to 5 in which the product is one of the following:
 - 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
 - 1-[3-(Butoxy)-4-methoxyphenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
 - 1-[4-Methoxy-3-(3-phenoxypropoxy)phenyl]ethanone-(E)-O-(aminocarbonyl)oxime;
 - 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone-(E)-O-(aminocarbonyl)oxime;
 - 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone-(E)-O-(aminocarbonyl)oxime;
 - 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanone-(E)-O-(aminocarbonyl)oxime;
 - 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-[(methylamino)carbonyl]oxime;
 - 1-(3-Butoxy-4-methoxyphenyl)ethanone-(E)-O-[(methylamino)carbonyl]oxime;
 - 1-(3-Butoxy-4-methoxyphenyl)ethanone-(E)-O-[(phenylamino)carbonyl]oxime;
 - 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]ethanone-(E)-O-(methoxycarbonyl)oxime;
 - 1-(3-Butoxy-4-methoxyphenyl)ethanone-(E)-O-(methoxycarbonyl)oxime;
 - 1-(3-Butoxy-4-methoxyphenyl)ethanone-(E)-O-(phenoxy carbonyl)oxime;
 - and
 - 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]ethanone-(E)-O-(aminocarbonyl)oxime.
8. A process for preparing a pharmaceutical composition which comprises bringing a compound of formula I as defined in Claim 1 into association with a pharmaceutically acceptable carrier.
9. An oxime of formula III as shown and defined in Claim 1 step (a) with the proviso that when R¹ is hydrogen then R is other than C₃-C₇ alkyl.
10. A process for preparing an oxime of formula III as defined in Claim 9 which comprises oximation of a corresponding ketone.
11. A compound of formula II

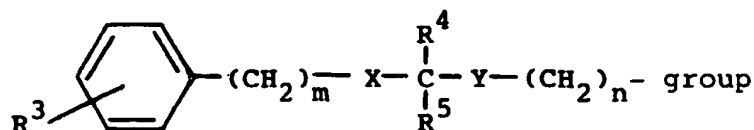


(II)

wherein R¹ is a C₁-C₄ alkyl and R is

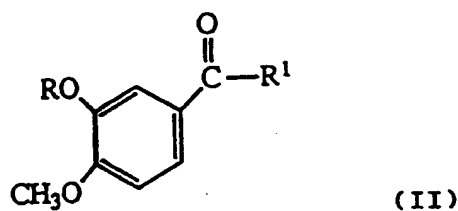


where R^3 , m , X , Y , R^4 , R^5 and n are as defined in Claim 1 providing that the

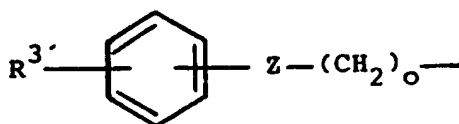


- 10 has more than 8 carbon atoms when X and Y are both bonds, and further providing that R is other than $\text{PhCH}_2\text{OCH}_2$ -when R^1 is methyl, or
 b) R^1 is alkyl wherein the number of carbon atoms is greater than 4 and not more than 6 and R is as defined in Claim 1.

- 15 12. A compound of formula II



- 25 wherein R^1 is



- 35 where R^3 , Z and o are as defined in Claim 1 and R is as defined in Claim 1.

13. A process for preparing a compound of formula III as defined in Claim 11 or Claim 12 which comprises oxidising a corresponding alcohol.
14. A compound of formula III as claimed in Claim 9 which is one of the following:
- 40 3-cyclopentyloxy-4-methoxyacetophenone oxime,
 3-butoxy-4-methoxyacetophenone oxime,
 4-methoxy-3-(3-phenoxypropoxy)acetophenone oxime,
 1-(3-cyclopentyloxy-4-methoxyphenyl)-2-phenylethanone oxime,
 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanone oxime,
 45 1-(3-cyclopentyloxy-4-methoxyphenyl)-3-methylpropanone oxime or
 3-(bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenone oxime.
15. A compound of formula II as claimed in Claim 13 which is 4-methoxy-3-(3-phenoxypropoxy)-acetophenone.
- 50

Patentansprüche

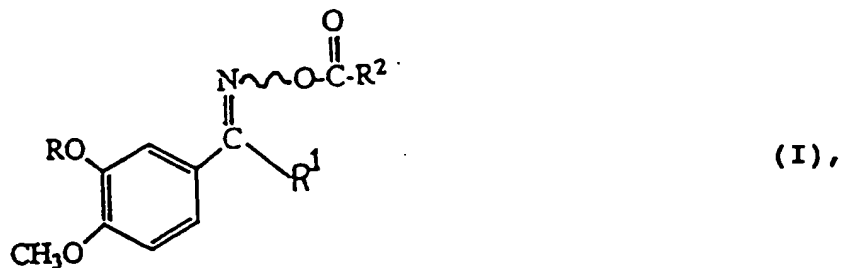
Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, DE, DK, FR, IT, LI, LU, NL, SE

1. Verbindung der Formel

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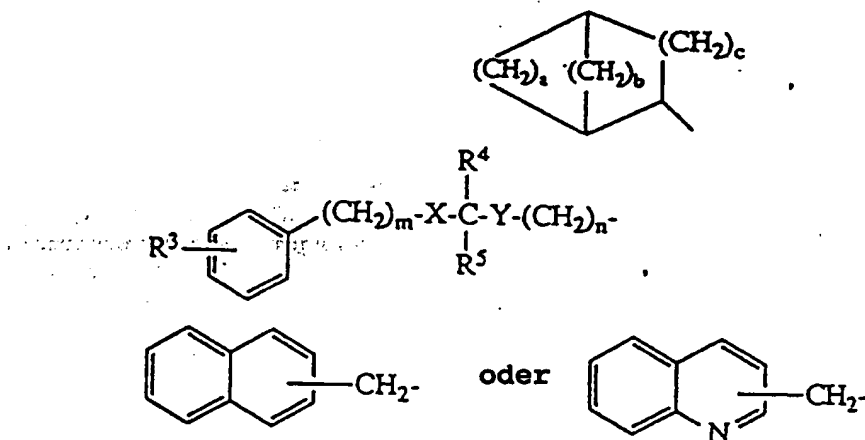
worin R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,

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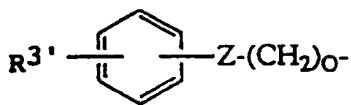
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bedeutet; R¹ Wasserstoff, C₁-C₆-Alkyl oder

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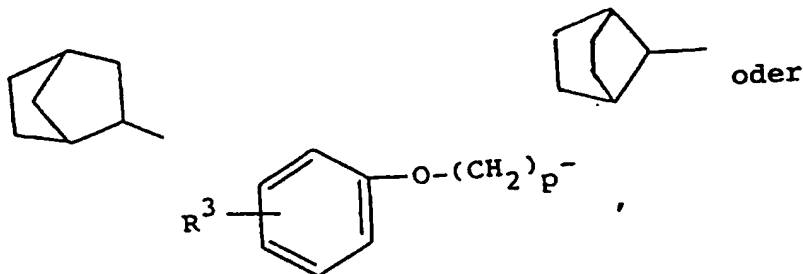
50

darstellt; a 1 bis 3 ist; b 1 bis 3 ist; c Null bis 2 ist; X, Y und Z jeweils unabhängig eine Bindung, O, S oder NH sind, mit der Maßgabe, daß, wenn eines von X oder Y die Bedeutung O, S oder NH hat, das andere eine Bindung sein muß; R² Amino, C₁-C₆-Alkylamino, Arylamino, C₁-C₆-Alkoxy oder Aryloxy darstellt; R³ und R^{3'} unabhängig Wasserstoff, Halogen, Hydroxy, C₁-C₆-Alkoxy, Aryloxy, C₂-C₇-Alkanoyloxy, Amino, C₁-C₆-Alkylamino, Arylamino oder C₂-C₇-Alkanoylamino sind; R⁴ und R⁵ jeweils unabhängig Wasserstoff oder C₁-C₆-Alkyl bedeuten; m Null bis 4 ist; n 1 bis 4 ist; und o 1 bis 4 ist.

55

2. Verbindung nach Anspruch 1, worin R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,

5

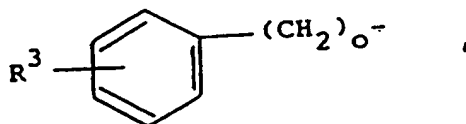


10

15 wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und p 2 bis 4 ist, bedeutet.

3. Verbindung nach Anspruch 1 oder 2, worin R¹ Wasserstoff, C₁-C₆-Alkyl oder

20



25

wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und o 1 bis 4 ist, bedeutet.

- 30 4. Verbindung nach einem der Ansprüche 1 bis 3, worin R² die Bedeutung NH₂ hat.

5. Verbindung nach Anspruch 1, welche eine der folgenden ist:

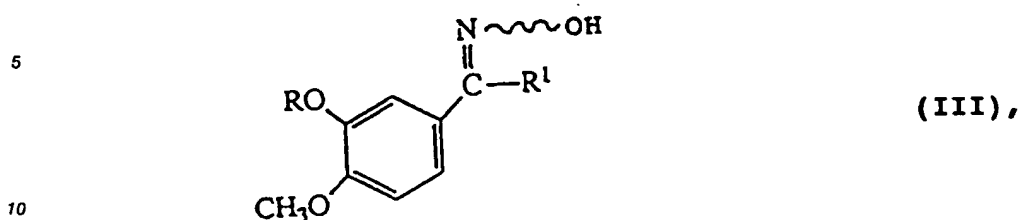
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Butoxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 35 1-[4-Methoxy-3-(3-phenoxypropoxy)-phenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-Cyclopentyloxy-4-methoxyphenyl]-2-phenylethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-Cyclopentyloxy-4-methoxyphenyl]-3-phenylpropanon-(E)-O-(aminocarbonyl)-oxim;
 1-[(3-Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 40 1-[3-Butoxy)-4-methoxyphenyl]-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 1-[3-Butoxy)-4-methoxyphenyl]-ethanon-(E)-O-[(phenylamino)-carbonyl]-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-[3-Butoxy-4-methoxyphenyl]-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-[3-Butoxy-4-methoxyphenyl]-ethanon-(E)-O-(phenoxy-carbonyl)-oxim; und
 45 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim.

6. Verfahren zur Herstellung einer Verbindung der Formel (I), wie in Anspruch 1 definiert, welches eines der folgenden umfaßt:

50

55

a) Carbamoylierung eines Oxims der Formel



15 worin R und R¹ wie in Anspruch 1 definiert sind, unter Verwendung eines geeigneten Isocyanat-Carbamoylierungsmittels, wobei eine Verbindung der Formel (I), worin R² Amino, C₁-C₆-Alkylamino oder Arylamino bedeutet, erhalten wird; oder

b) Carbonatisierung eines Oxims der Formel (III), wie oben definiert, unter Verwendung eines Carbonatisierungsmittels, das eine (C₁-C₆-Alkyl- oder



25 enthält, wobei eine Verbindung der Formel (I), worin R² C₁-C₆-Alkoxy oder Aryloxy bedeutet, erhalten wird.

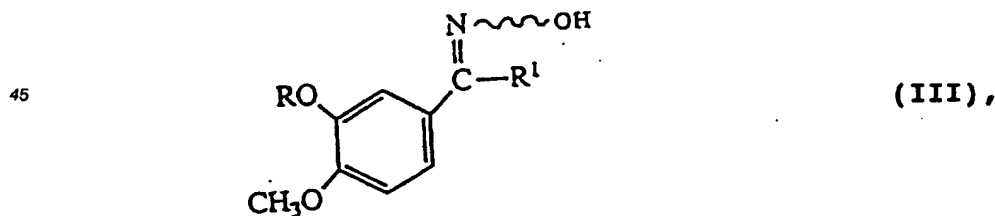
7. Verfahren (a) nach Anspruch 6, bei welchem das Carbamoylierungsmittel Natriumcyanat, Chlorsulfonylisocyanat, Trichloracetylisocyanat oder C₁-C₆-Alkyl- oder Arylisocyanat ist.

30 8. Verfahren (b) nach Anspruch 6, worin das Carbonatisierungsmittel ein C₁-C₆-Alkyl- oder Arylchloroformat ist.

35 9. Verbindung der Formel (I), wie in einem der Ansprüche 1 bis 5 definiert, zur Verwendung als Pharmazeutikum.

10. Pharmazeutische Zusammensetzung, welche eine Verbindung der Formel (I), wie in einem der Ansprüche 1 bis 5 definiert, und einen pharmazeutisch annehmbaren Träger umfaßt.

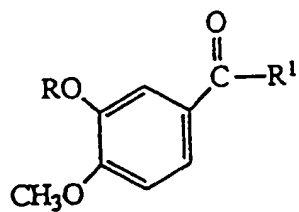
40 11. Verbindung der Formel (III)



worin R und R¹ wie in einem der Ansprüche 1 bis 3 definiert sind, mit der Maßgabe, daß, wenn R¹ Wasserstoff bedeutet, R von C₃-C₇-Alkyl verschieden ist.

55 12. Verfahren zur Herstellung einer Verbindung der Formel (III), wie in Anspruch 11 definiert, welches die Oximierung einer entsprechenden Verbindung der Formel (II)

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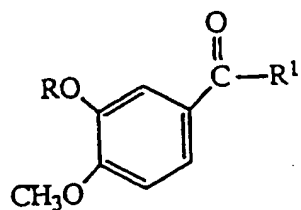
(II),

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worin R und R¹ wie in Anspruch 11 definiert sind, umfaßt.

13. Verbindung der Formel (II)

15

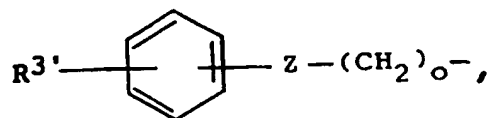


(II),

20

worin R¹ die Bedeutung

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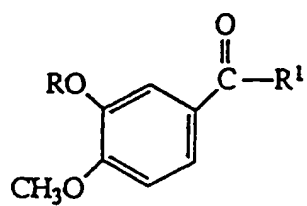


30

wobei R^{3'}, Z und o wie in Anspruch 1 definiert sind, und R wie in Anspruch 1 definiert ist, hat.

14. Verbindung der Formel (II)

35



(II),

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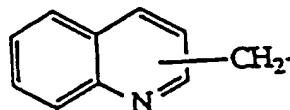
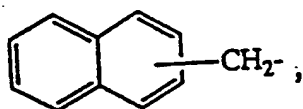
45

worin

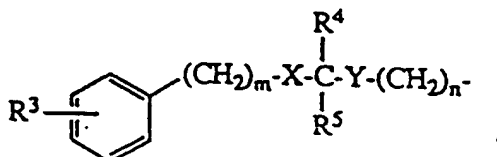
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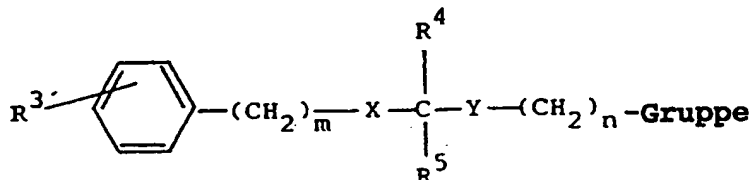
a) R¹ C₁-C₄-Alkyl bedeutet, und R



oder



wobei R³, m, X, Y, R⁴, R⁵ und n wie in Anspruch 1 definiert sind, darstellt, mit der Maßgabe, daß die



mehr als 8 Kohlenstoffatome aufweist, wenn X und Y beide Bindungen sind, und ferner mit der Maßgabe, daß R von PhCH₂OCH₂- verschieden ist, wenn R¹ Methyl bedeutet, oder:

b) R¹ Alkyl, wobei die Anzahl von Kohlenstoffatomen größer als 4 und nicht mehr als 6 ist, darstellt, und R wie in Anspruch 1 definiert ist.

15. Verfahren zur Herstellung eines Ketons der Formel (II), wie in Anspruch 13 oder 14 definiert, welches das Oxidieren eines entsprechenden Alkohols umfaßt.

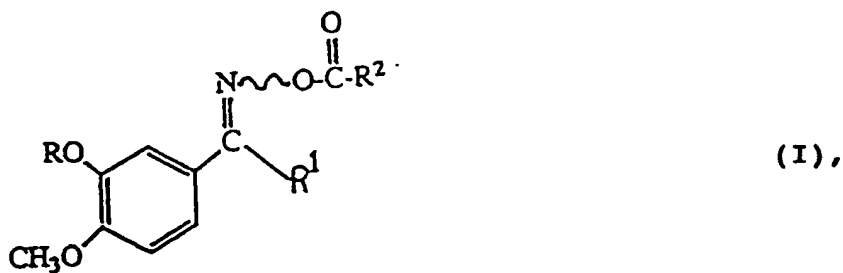
16. Verbindung der Formel (III) nach Anspruch 11, welche eine der folgenden ist:

- 3-Cyclopentyloxy-4-methoxyacetophenonoxim,
- 3-Butoxy-4-methoxyacetophenonoxim,
- 4-Methoxy-3-(3-phenoxypropoxy)-acetophenonoxim,
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanonoxim,
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanonoxim,
- 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylpropanonoxim oder
- 3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenonoxim.

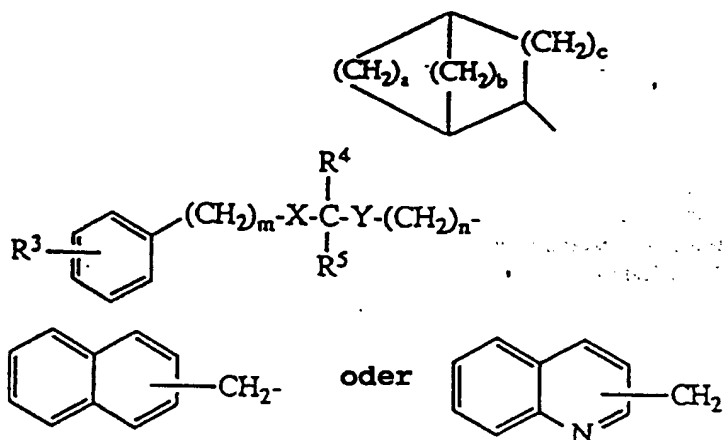
17. Verbindung der Formel (II) nach Anspruch 14, welche 4-Methoxy-3-(3-phenoxypropoxy)-acetophenon ist.

Patentansprüche für folgenden Vertragsstaat : ES

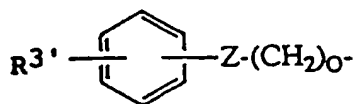
1. Verfahren zur Herstellung einer Verbindung der Formel



15 worin R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,



bedeutet; R¹ Wasserstoff, C₁-C₆-Alkyl oder

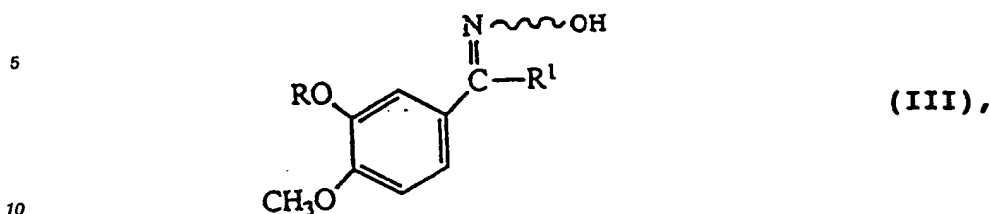


45 darstellt; a 1 bis 3 ist; b 1 bis 3 ist; c Null bis 2 ist; X, Y und Z jeweils unabhängig eine Bindung, O, S oder NH sind, mit der Maßgabe, daß, wenn eines von X oder Y die Bedeutung O, S oder NH hat, das andere eine Bindung sein muß; R² Amino, C₁-C₆-Alkylamino, Arylamino, C₁-C₆-Alkoxy oder Aryloxy darstellt; R³ und R^{3'} unabhängig Wasserstoff, Halogen, Hydroxy, C₁-C₆-Alkoxy, Aryloxy, C₂-C₇-Alkanoyloxy, Amino, C₁-C₆-Alkylamino, Arylamino, C₂-C₇-Alkanoylamino sind; R⁴ und R⁵ jeweils unabhängig Wasserstoff oder C₁-C₆-Alkyl bedeuten; m Null bis 4 ist; n 1 bis 4 ist; und o 1 bis 4 ist; welches eines der folgenden umfaßt:

50

55

a) Carbamoylierung eines Oxims der Formel



15 worin R und R¹ wie oben definiert sind, unter Verwendung eines geeigneten Isocyanat-Carbamoylierungsmittels, wobei eine Verbindung der Formel (I), worin R² Amino, C₁-C₆-Alkylamino oder Arylamino bedeutet, erhalten wird; oder

b) Carbonatisierung eines Oxims der Formel (III), wie oben definiert, unter Verwendung eines Carbonatisierungsmittels, das eine (C₁-C₆-Alkyl- oder

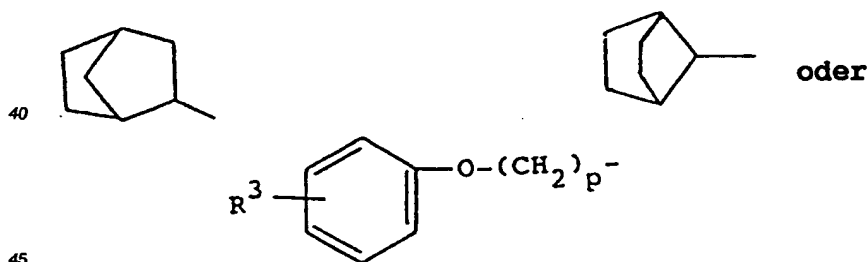


25 enthält, wobei eine Verbindung der Formel (I), worin R² C₁-C₆-Alkoxy oder Aryloxy bedeutet, erhalten wird.

30 2. Verfahren (a) nach Anspruch 1, bei welchem das Carbamoylierungsmittel Natriumcyanat, Chlorsulfonylisocyanat, Trichloracetylisocyanat oder C₁-C₆-Alkyl- oder Arylisocyanat ist.

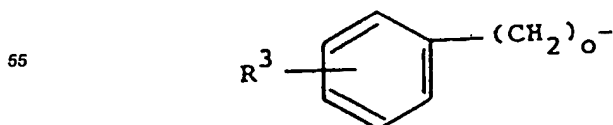
3. Verfahren (b) nach Anspruch 1, worin das Carbonatisierungsmittel ein C₁-C₆-Alkyl- oder Arylchloroformat ist.

35 4. Verfahren nach einem der Ansprüche 1 bis 3, bei welchem R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,



wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und p 2 bis 4 ist, bedeutet.

50 5. Verfahren nach einem der Ansprüche 1 bis 4, bei welchem R¹ Wasserstoff, C₁-C₆-Alkyl oder



wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und o 1 bis 4 ist, bedeutet.

6. Verfahren nach einem der Ansprüche 1 bis 5, worin R² die Bedeutung NH₂ hat.

5

7. Verfahren nach einem der Ansprüche 1 bis 5, bei welchem das Produkt eines der folgenden ist:

- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Butoxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[4-Methoxy-3-(3-phenoxypropoxy)-phenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 10 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanon-(E)-O-(aminocarbonyl)-oxim;
 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanon-(E)-O-(aminocarbonyl)-oxim;
 1-[(3-Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 1-(3-Butoxy)-4-methoxyphenyl)-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 15 1-(3-Butoxy)-4-methoxyphenyl)-ethanon-(E)-O-[(phenylamino)-carbonyl]-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-(3-Butoxy-4-methoxyphenyl)-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-(3-Butoxy-4-methoxyphenyl)-ethanon-(E)-O-(phenoxycarbonyl)-oxim; und
 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim.

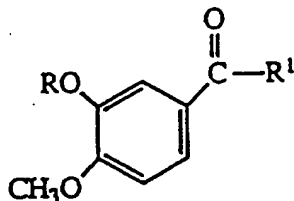
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8. Verfahren zur Herstellung einer pharmazeutischen Zusammensetzung, welches das Vereinigen einer Verbindung der Formel (I), wie in Anspruch 1 definiert, mit einem pharmazeutisch annehmbaren Träger umfaßt.

25

9. Verfahren zur Herstellung eines Oxims der Formel (III), wie in Anspruch 1 definiert, mit der Maßgabe, daß, wenn R¹ Wasserstoff bedeutet, R von C₃-C₇-Alkyl verschieden ist, welches die Oximierung einer entsprechenden Verbindung der Formel (II)

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(II),

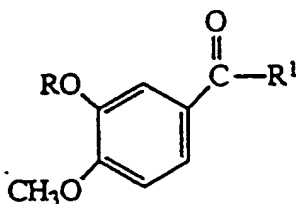
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worin R und R¹ wie oben definiert sind, umfaßt.

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10. Verfahren zur Herstellung einer Verbindung der Formel (II)

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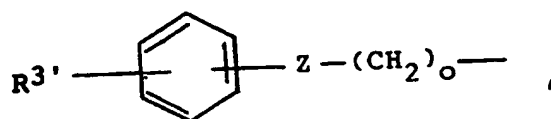


(II),

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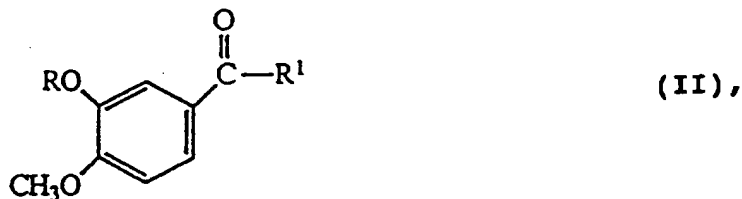
worin R¹ die Bedeutung

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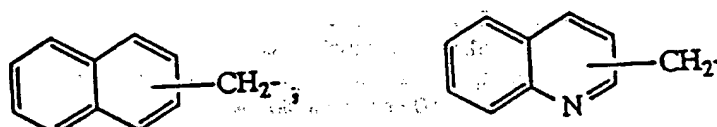
wobei $R^{3'}$, Z und o wie in Anspruch 1 definiert sind, und R wie in Anspruch 1 definiert ist, hat, welches das Oxidieren des entsprechenden Alkohols umfaßt.

11. Verfahren zur Herstellung einer Verbindung der Formel (II)

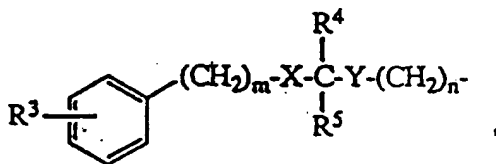


worin

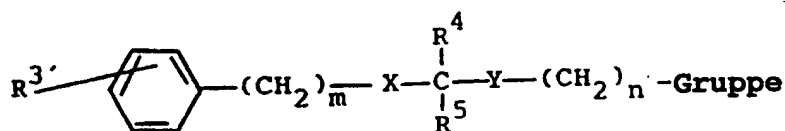
a) R^1 C_1 - C_4 -Alkyl bedeutet, und R



oder



wobei R^3 , m, X, Y, R^4 , R^5 und n wie in Anspruch 1 definiert sind, darstellt, mit der Maßgabe, daß die



mehr als 8 Kohlenstoffatome aufweist, wenn X und Y beide Bindungen sind, und ferner mit der Maßgabe, daß R von $\text{PhCH}_2\text{OCH}_2$ - verschieden ist, wenn R^1 Methyl bedeutet, oder

b) R^1 Alkyl, wobei die Anzahl von Kohlenstoffatomen größer als 4 und nicht mehr als 6 ist, darstellt, und R wie in Anspruch 1 definiert ist, welches das Oxidieren eines entsprechenden Alkohols umfaßt.

12. Verfahren nach Anspruch 9, bei welchem das hergestellte Oxim der Formel (III) eines der folgenden ist:

3-Cyclopentyloxy-4-methoxyacetophenonoxim,

3-Butoxy-4-methoxyacetophenonoxim,

4-Methoxy-3-(3-phenoxypropoxy)-acetophenonoxim,

1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanonoxim,

1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanonoxim,

1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylpropanonoxim oder

3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenonoxim.

13. Verfahren nach Anspruch 11, bei welchem die hergestellte Verbindung der Formel (II) 4-Methoxy-3-(3-phenoxypropoxy)-acetophenon ist.

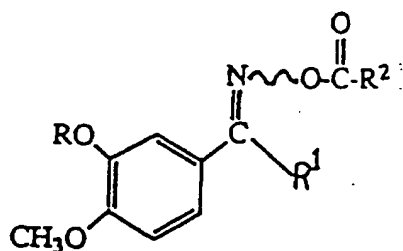
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Patentansprüche für folgenden Vertragsstaat : GR

1. Verfahren zur Herstellung einer Verbindung der Formel

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15



(I),

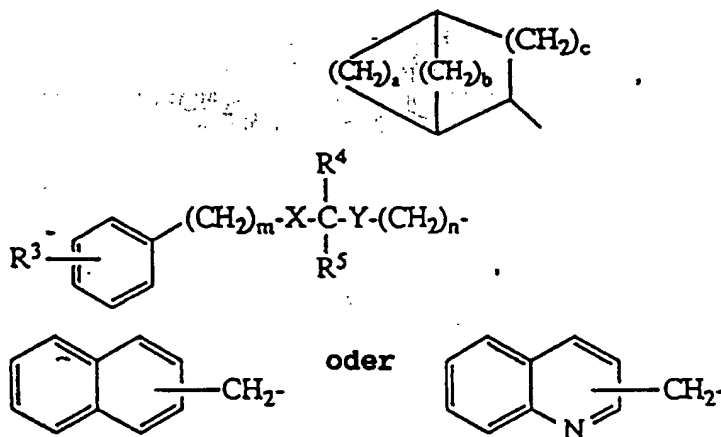
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worin R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,

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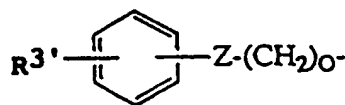
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bedeutet; R¹ Wasserstoff, C₁-C₆-Alkyl oder

45

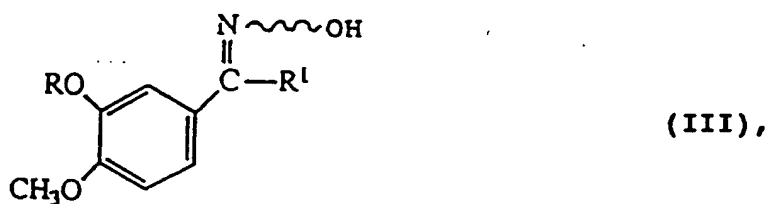


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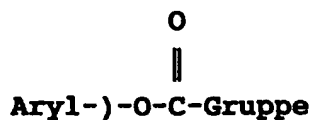
darstellt; a 1 bis 3 ist; b 1 bis 3 ist; c Null bis 2 ist; X, Y und Z jeweils unabhängig eine Bindung, O, S oder NH sind, mit der Maßgabe, daß, wenn eines von X oder Y die Bedeutung O, S oder NH hat, das andere eine Bindung sein muß; R² Amino, C₁-C₆-Alkylamino, Arylamino, C₁-C₆-Alkoxy oder Aryloxy darstellt; R³ und R^{3'} unabhängig Wasserstoff, Halogen, Hydroxy, C₁-C₆-Alkoxy, Aryloxy, C₂-C₇-Alkanoyloxy, Amino, C₁-C₆-Alkylamino, Arylamino oder C₂-C₇-Alkanoylamino sind; R⁴ und R⁵ jeweils unabhängig Wasserstoff oder C₁-C₆-Alkyl bedeuten; m Null bis 4 ist; n 1 bis 4 ist; und o 1 bis 4 ist; welches eines der folgenden umfaßt:

a) Carbamoylierung eines Oxims der Formel



worin R und R¹ wie oben definiert sind, unter Verwendung eines geeigneten Isocyanat-Carbonylierungsmittels, wobei eine Verbindung der Formel (I), worin R² Amino, C₁-C₆-Alkylamino oder Arylamino bedeutet, erhalten wird; oder

b) Carbonatisierung eines Oxims der Formel (III), wie oben definiert, unter Verwendung eines Carbonatisierungsmittels, das eine (C₁-C₆-Alkyl- oder

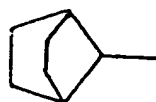
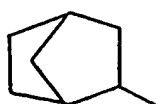


25 enthält, wobei eine Verbindung der Formel (I), worin R² C₁-C₆-Alkoxy oder Aryloxy bedeutet, erhalten wird.

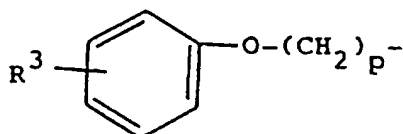
2. Verfahren (a) nach Anspruch 1, bei welchem das Carbamoylierungsmittel Natriumcyanat, Chlorsulfonylisocyanat, Trichloracetylisocyanat oder C₁-C₆-Alkyl- oder Arylisocyanat ist.

3. Verfahren (b) nach Anspruch 1, worin das Carbonatisierungsmittel ein C₁-C₆-Alkyl- oder Arylchloroformat ist.

4. Verfahren nach einem der Ansprüche 1 bis 3, bei welchem R C₃-C₇-Alkyl, C₃-C₇-Cycloalkyl,

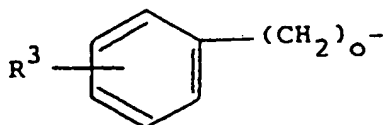


oder



wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und p 2 bis 4 ist, bedeutet.

5. Verfahren nach einem der Ansprüche 1 bis 4, bei welchem R¹ Wasserstoff, C₁-C₆-Alkyl oder



wobei R³ Wasserstoff, Halogen, Hydroxy, Acetoxy, Amino oder Acetamido darstellt, und o 1 bis 4 ist, bedeutet.

6. Verfahren nach einem der Ansprüche 1 bis 5, worin R² die Bedeutung NH₂ hat.

7. Verfahren nach einem der Ansprüche 1 bis 5, bei welchem das Produkt eines der folgenden ist:

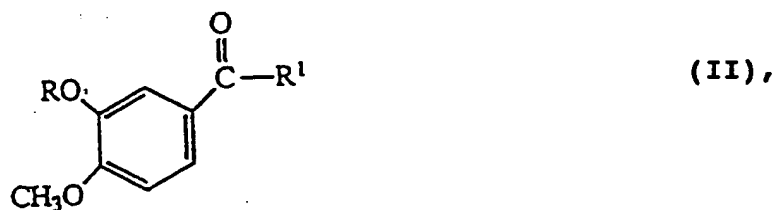
- 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Butoxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-[4-Methoxy-3-(3-phenoxypropoxy)-phenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim;
 1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanon-(E)-O-(aminocarbonyl)-oxim;
 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanon-(E)-O-(aminocarbonyl)-oxim;
 1-[(3-Cyclopentyloxy)-4-methoxyphenyl]-3-methylbutanon-(E)-O-(aminocarbonyl)-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 1-(3-Butoxy)-4-methoxyphenyl)-ethanon-(E)-O-[(methylamino)-carbonyl]-oxim;
 1-(3-Butoxy)-4-methoxyphenyl)-ethanon-(E)-O-[(phenylamino)-carbonyl]-oxim;
 1-[3-(Cyclopentyloxy)-4-methoxyphenyl]-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-(3-Butoxy-4-methoxyphenyl)-ethanon-(E)-O-(methoxycarbonyl)-oxim;
 1-(3-Butoxy-4-methoxyphenyl)-ethanon-(E)-O-(phenoxy-carbonyl)-oxim; und
 1-[3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyphenyl]-ethanon-(E)-O-(aminocarbonyl)-oxim.

8. Verfahren zur Herstellung einer pharmazeutischen Zusammensetzung, welches das Vereinigen einer Verbindung der Formel (I), wie in Anspruch 1 definiert, mit einem pharmazeutisch annehmbaren Träger umfaßt.

9. Oxim der Formel (III), wie in Anspruch 1, Schritt (a), gezeigt und definiert, mit der Maßgabe, daß, wenn R¹ Wasserstoff bedeutet, R von C₃-C₇-Alkyl verschieden ist.

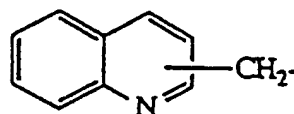
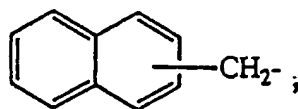
10. Verfahren zur Herstellung eines Oxims der Formel (III), wie in Anspruch 9 definiert, welches die Oximierung eines entsprechenden Ketons umfaßt.

11. Verbindung der Formel (II)

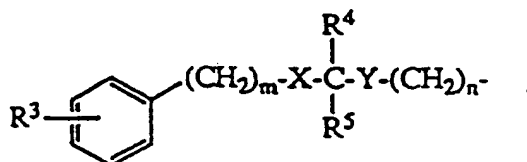


worin

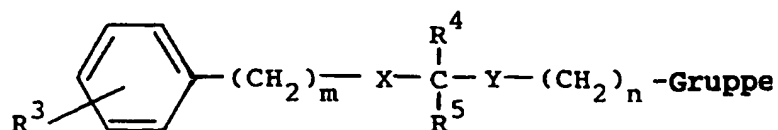
a) R¹ C₁-C₄-Alkyl bedeutet, und R



oder



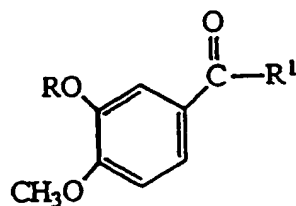
wobei R^3 , m , X , Y , R^4 , R^5 und n wie in Anspruch 1 definiert sind, darstellt, mit der Maßgabe, daß die



10 mehr als 8 Kohlenstoffatome aufweist, wenn X und Y beide Bindungen sind, und ferner mit der Maßgabe, daß R von $\text{PhCH}_2\text{OCH}_2$ - verschieden ist, wenn R^1 Methyl bedeutet, oder

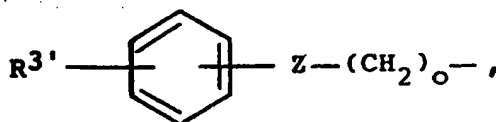
b) R^1 Alkyl, wobei die Anzahl von Kohlenstoffatomen größer als 4 und nicht mehr als 6 ist, darstellt, und R wie in Anspruch 1 definiert ist.

15 12. Verbindung der Formel (II)



(II),

25 worin R^1 die Bedeutung



35 wobei R^3 , Z und o wie in Anspruch 1 definiert sind, und R wie in Anspruch 1 definiert ist, hat.

13. Verfahren zur Herstellung einer Verbindung der Formel (III), wie in Anspruch 11 oder 12 definiert, welches das Oxidieren eines entsprechenden Alkohols umfaßt.

14. Verbindung der Formel (III) nach Anspruch 9, welche eine der folgenden ist:

- 40 3-Cyclopentyloxy-4-methoxyacetophenonoxim,
3-Butoxy-4-methoxyacetophenonoxim,
4-Methoxy-3-(3-phenoxypropoxy)-acetophenonoxim,
1-(3-Cyclopentyloxy-4-methoxyphenyl)-2-phenylethanonoxim,
1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-phenylpropanonoxim,
45 1-(3-Cyclopentyloxy-4-methoxyphenyl)-3-methylpropanonoxim oder
3-(Bicyclo[2.2.1]hept-2-yloxy)-4-methoxyacetophenonoxim.

15. Verbindung der Formel (II) nach Anspruch 13, welche 4-Methoxy-3-(3-phenoxypropoxy)-acetophenon ist.

Revendications

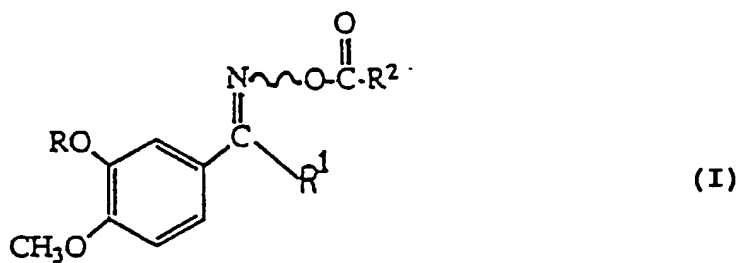
Revendications pour les Etats contractants suivants : AT, BE, CH, DE, DK, FR, IT, LI, LU, NL, SE

1. Composé de formule :

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où

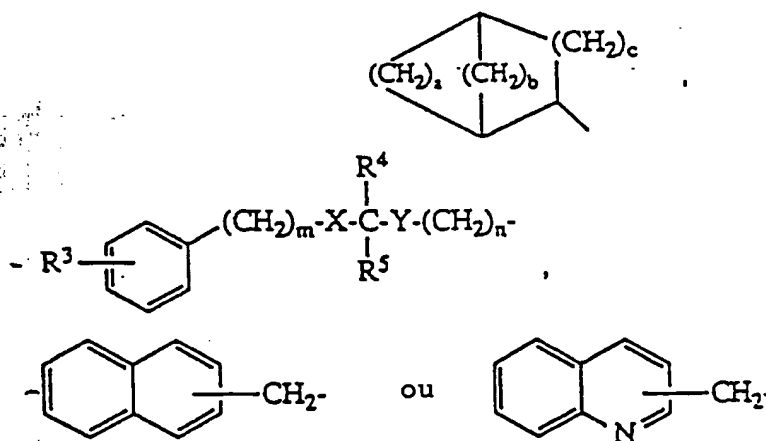
R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,

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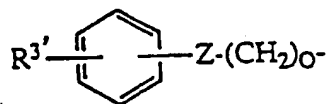
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R¹ est hydrogène, alcoyle en C₁₋₆ ou

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a est 1 à 3;

b est 1 à 3;

c est 0 à 2;

50

X, Y et Z sont chacun indépendamment une liaison, O, S ou NH, à la condition que si l'un des X ou Y est O, S ou NH, l'autre doit être une liaison;

R² est amino, (alcoyle en C₁₋₆)amino, arylamino, alcoxy en C₁₋₆ ou aryloxy;R³ et R^{3'} sont indépendamment hydrogène, halo, hydroxyle, alcoxy en C₁₋₆, aryloxy, alcanoyloxy en C₂₋₇, amino, alcoylamino en C₁₋₆, arylamino ou (alcanoyloxy en C₂₋₇)amino;

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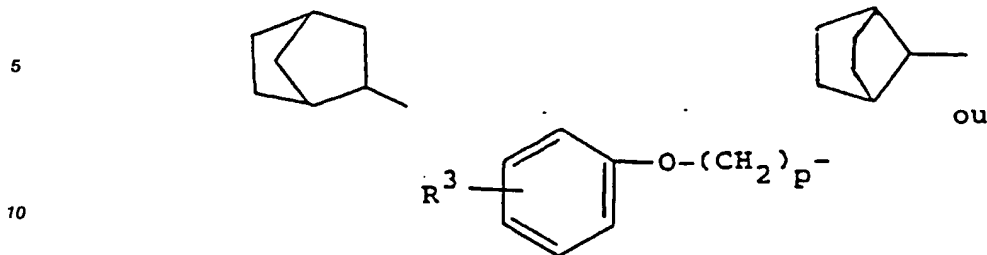
R⁴ et R⁵ sont chacun indépendamment hydrogène ou alcoyle en C₁₋₆;

m est 0 à 4;

n est 1 à 4, et

o est 1 à 4.

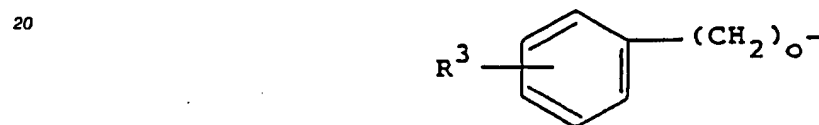
2. Composé suivant la revendication 1, où R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,



où

- 15 R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et p est 2 à 4.

3. Composé suivant la revendication 1 ou 2, où R¹ est hydrogène, alcoyle en C₁₋₆ ou



où

- R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et o est 1 à 4.

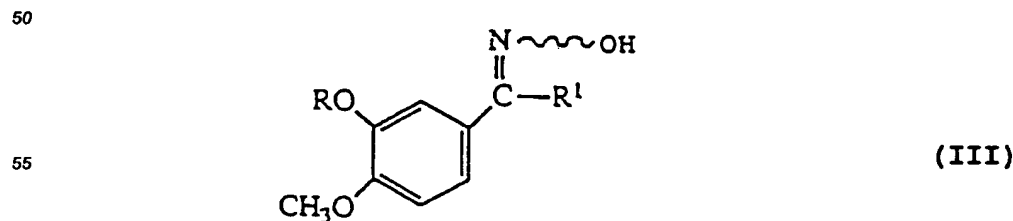
4. Composé suivant l'une quelconque des revendications 1 à 3, où R² est NH₂.

5. Composé suivant la revendication 1, qui est l'un des suivants :

- 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(butoxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-[4-méthoxy-3-(3-phénoxypropoxy)phényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-(3-cyclopentyl-4-méthoxyphényl)-2-phényléthanone-(E)-O-(aminocarbonyl)oxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]-3-méthylbutanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[phénylamino]carbonyl]oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(méthoxycarbonyl)oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(méthoxycarbonyl)oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(phénoxy)carbonyl]oxime, et
 1-[3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime.

6. Procédé de préparation d'un composé de formule (I) comme défini dans la revendication 1, qui comprend l'un des suivants :

- a) carbamoylation d'un oxime de formule :



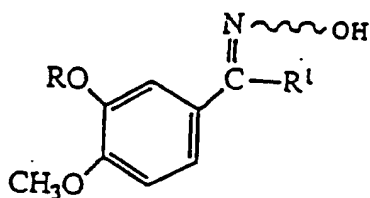
où

R et R¹ sont comme défini dans la revendication 1, au moyen d'un isocyanate agent de carbamoylation approprié pour donner un composé de formule (I), dans lequel R² est amino, alcoylamino en C₁₋₆ ou arylamino;

ou

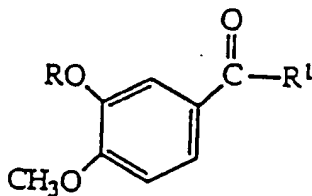
b) carbonatation d'un oxime de formule (III) comme défini ci-dessus, au moyen d'un agent de carbonatation contenant une partie (alcoyle en C₁₋₆ ou aryle) -O-C(=O)-pour donner un composé de formule (I) où R₂ est alcoxy en C₁₋₆ ou aryloxy.

7. Procédé a) suivant la revendication 6, dans lequel l'agent de carbamoylation est le cyanate de sodium, l'isocyanate de chlorosulfonyle, l'isocyanate de trichloracétyle ou l'isocyanate d'alcoyle en C₁₋₆ ou d'aryle.
8. Procédé b) suivant la revendication 6, dans lequel l'agent de carbonatation est le chloroformiate d'alcoyle en C₁₋₆ ou d'aryle.
9. Composé de formule (I) tel que défini dans l'une quelconque des revendications 1 à 5, à utiliser comme un agent pharmaceutique.
10. Composition pharmaceutique comprenant un composé de formule (I) comme défini dans l'une quelconque des revendications 1 à 5, et un excipient pharmaceutiquement acceptable.
11. Composé de formule (III) :



(III)

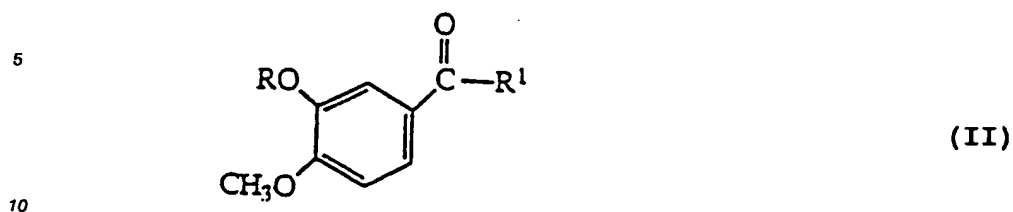
12. Procédé de préparation d'un composé de formule (III) tel que défini à la revendication 11, qui comprend l'oximation d'un composé correspondant de formule (II) :



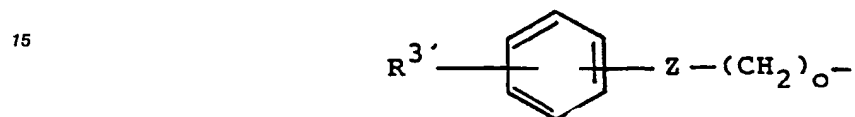
(II)

13. Composé de formule (II) tel que défini à la revendication 11, dans lequel R et R¹ sont tels que définis à la revendication 11.

13. Composé de formule (II) :



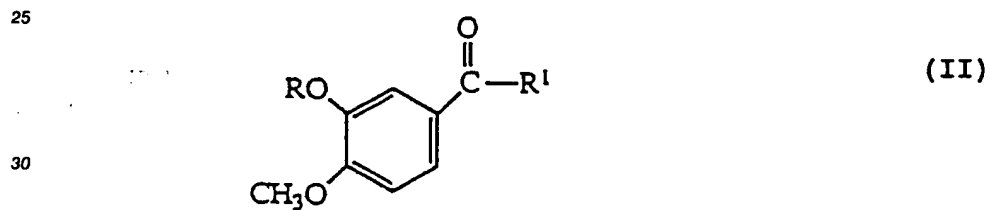
dans lequel R¹ est



20 où

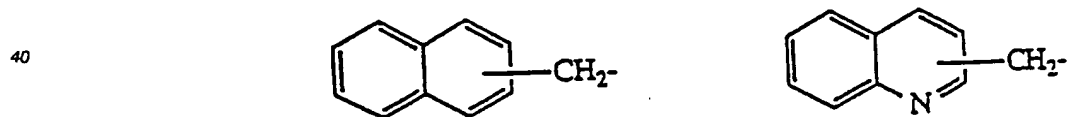
R^{3'}, Z et o sont tels que définis à la revendication 1 et R est tel que défini à la revendication 1.

14. Composé de formule (II) :

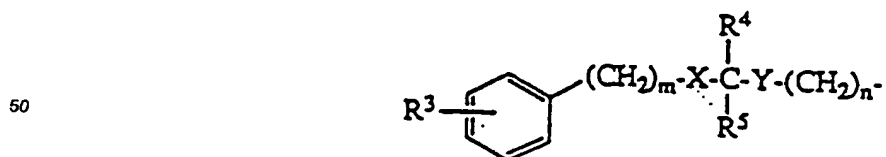


dans lequel :

35 a) R¹ est alcoyle en C₁₋₄ et R est :

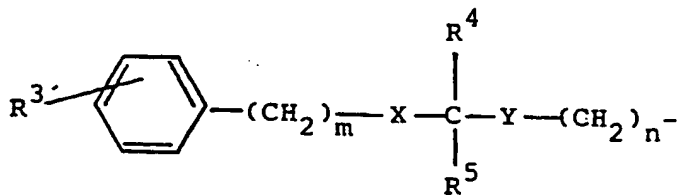


45 ou



55 où

R^{3'}, m, X, Y, R⁴, R⁵ et n sont tels que définis dans la revendication 1, à la condition que le radical :



a plus de 8 atomes de carbone lorsque X et Y sont tous deux des liaisons et de plus que R est autre que $\text{PhCH}_2\text{OCH}_2$ -lorsque R^1 est méthyle, ou

b) R¹ est alcoyle dans lequel le nombre d'atomes de carbone est supérieur à 4 et non supérieur à 6 et R est tel que défini à la revendication 1.

15. Procédé de préparation d'une cétone de formule (II) comme défini à la revendication 13 ou 14, qui comprend l'oxydation d'un alcool correspondant.

16. Composé de formule (III) suivant la revendication 11, qui est l'un des suivants :

3-cyclopentyloxy-4-méthoxyacétophénoneoxime;

3-butoxy-4-méthoxyacétophénoneoxime;

4-méthoxy-3-(3-phénoxypropoxy)acétophénoneoxime;

1-(3-cyclopentyloxy-4-méthoxyphényl)-2-phényléthanoneoxime;

1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanoneoxime;

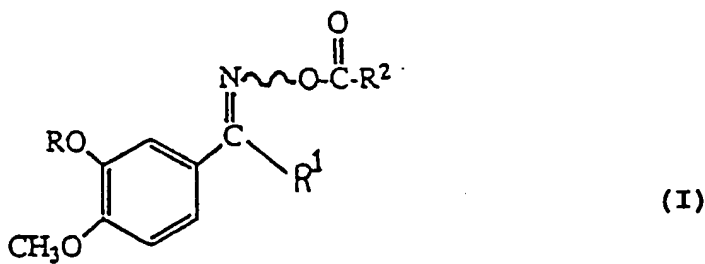
1-(3-cyclopentyloxy-4-méthoxyphényl)-3-méthylpropanoneoxime, ou

3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyacétophénoneoxime.

17. Composé de formule (II) suivant la revendication 14, qui est la 4-méthoxy-3-(3-phénoxypropoxy)-acétophénone.

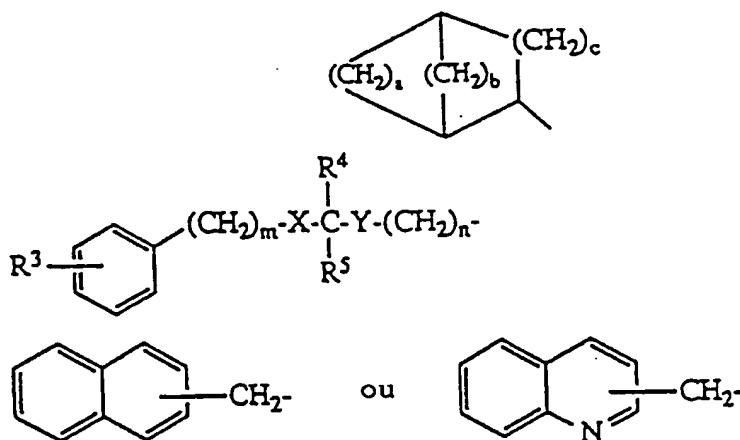
Revendications pour l'Etat contractant suivant : ES

1. Procédé de préparation d'un composé de formule :

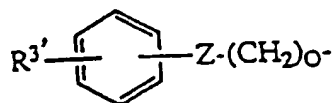


où

R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,



R¹ est hydrogène, alcoyle en C₁₋₆ ou



a est 1 à 3;

b est 1 à 3;

c est 0 à 2;

X, Y et Z sont chacun indépendamment une liaison, O, S ou NH, à la condition que si l'un des X ou Y est O, S ou NH, l'autre doit être une liaison;

R² est amino, (alcoyle en C₁₋₆)amino, arylamino, alcoxy en C₁₋₆ ou aryloxy;

R³ et R⁴ sont indépendamment hydrogène, halo, hydroxyle, alcoxy en C₁₋₆, aryloxy, alcanoyloxy en C₂₋₇ amino, alcoylamino en C₁₋₆, arylamino ou (alcanoyle en C₂₋₇)amino;

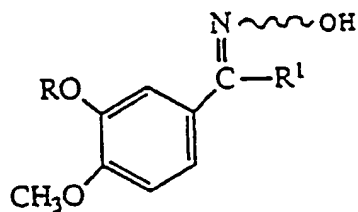
R⁴ et R⁵ sont chacun indépendamment hydrogène ou alcoyle en C₁₋₆;

m est 0 à 4;

n est 1 à 4, et

o est 1 à 4, qui comprend l'un des suivants :

a) carbamoylation d'un oxime de formule :



(III)

où

R et R¹ sont comme défini ci-dessus au moyen d'un isocyanate agent de carbamoylation approprié pour donner un composé de formule (I), dans lequel R² est amino, alcoylamino en C₁₋₆ ou arylamino; ou

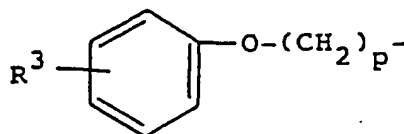
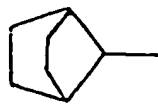
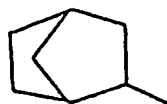
b) carbonatation d'un oxime de formule (III) comme défini ci-dessus, au moyen d'un agent de carbonatation contenant une partie (alcoyle en C₁₋₆ ou aryle)-O-C(=O)- pour donner un composé de formule (I) où R² est alcoxy en C₁₋₆ ou aryloxy.

2. Procédé a) suivant la revendication 1, dans lequel l'agent de carbamoylation est le cyanate de sodium, l'isocyanate de chlorosulfonyle, l'isocyanate de trichloroacétyle ou l'isocyanate d'alcoyle en C₁₋₆ ou d'aryle.
- 5 3. Procédé b) suivant la revendication 1, dans lequel l'agent de carbonatation est le chloroformiate d'alcoyle en C₁₋₆ ou d'aryle.
4. Procédé suivant l'une quelconque des revendications 1 à 3, dans lequel R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,

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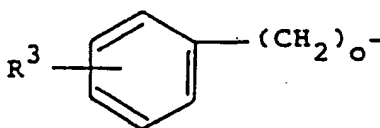
ou

dans lequel R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et p est 2 à 4.

5. Procédé suivant l'une quelconque des revendications 1 à 4, dans lequel R¹ est hydrogène, alcoyle en C₁₋₆ ou

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dans lequel R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et o est 1 à 4.

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6. Procédé suivant l'une quelconque des revendications 1 à 5, dans lequel R² est NH₂.
7. Procédé suivant l'une quelconque des revendications 1 à 5, dans lequel le produit est l'un des suivants :

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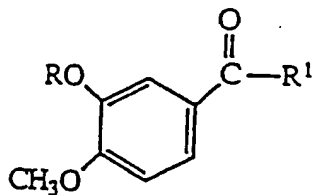
1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(butoxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-[4-méthoxy-3-(3-phénoxypropoxy)phényl]éthanone-(E)-O-(aminocarbonyl)oxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-2-phényléthanone-(E)-O-(aminocarbonyl)oxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]-3-méthylbutanone-(E)-O-(aminocarbonyl)oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[phénylamino]carbonyl]oxime;
 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(méthoxycarbonyl)oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(méthoxycarbonyl)oxime;
 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(phénoxy)carbonyl]oxime, et
 1-[3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime.

8. Procédé de préparation d'une composition pharmaceutique, qui comprend la mise en association d'un composé de formule (I) tel que défini à la revendication 1, avec un excipient pharmaceutiquement acceptable.

9. Procédé de préparation d'un oxime de formule (III) tel que défini à la revendication 1, à la condition que lorsque R¹ est hydrogène, alors R est autre que alcoyle en C₃₋₇ qui comprend l'oximation d'un composé correspondant de formule II :

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(II)

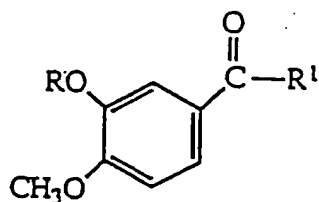
dans lequel R et R¹ sont tels que définis ci-dessus.

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10. Procédé de préparation d'un composé de formule (II) :

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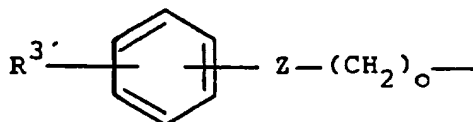
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(II)

dans lequel R¹ est

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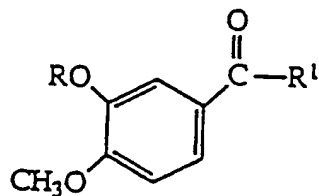
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où R³, Z et o sont tels que définis dans la revendication 1 et R est tel que défini dans la revendication 1, qui comprend l'oxydation d'un alcool correspondant.

11. Procédé de préparation d'un composé de formule (II) :

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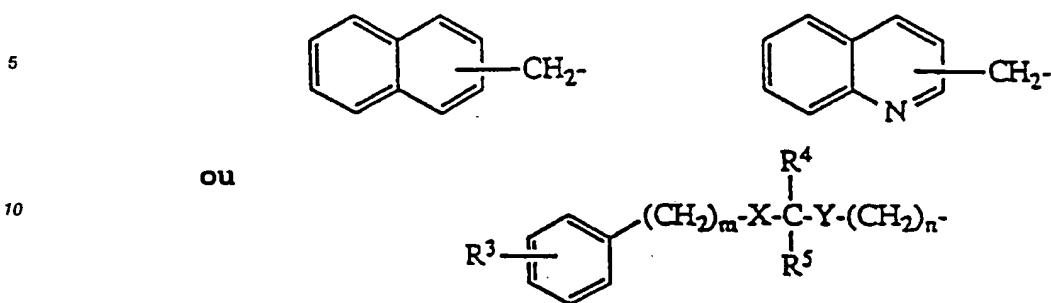
(II)

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dans lequel :

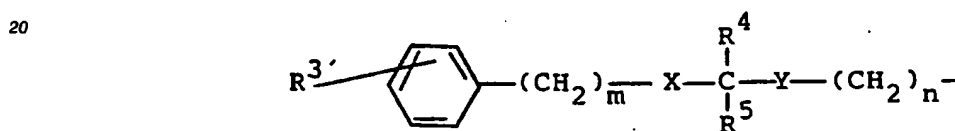
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a) R¹ est alcoyle en C₁₋₄ et R est :



où

R³, m, X, Y, R⁴, R⁵ et n sont tels que définis à la revendication 1, pourvu que le radical :



a plus de 8 atomes de carbone lorsque X et Y sont tous deux des liaisons et de plus, que R est autre que PhCH₂OCH₂-lorsque R¹ est méthyle,

ou

b) R¹ est alcoyle, dans lequel le nombre d'atomes de carbone est supérieur à 4 et non supérieur à 6 et R est comme défini à la revendication 1, qui comprend l'oxydation d'un alcool correspondant.

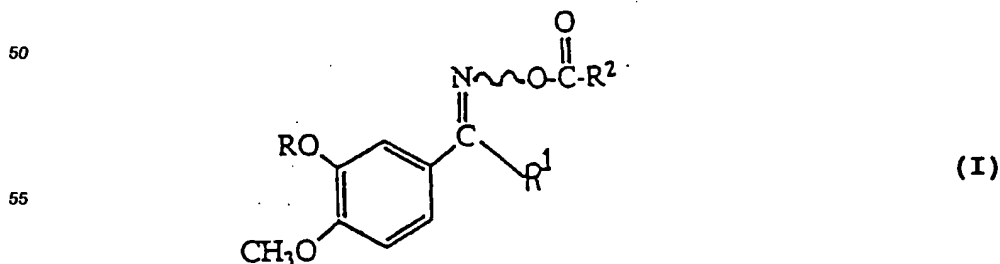
12. Procédé suivant la revendication 9, dans lequel l'oxime de formule (III) préparé est l'un des suivants :

- 3-cyclopentyloxy-4-méthoxyacétophénoneoxime;
 3-butoxy-4-méthoxyacétophénoneoxime;
 4-méthoxy-3-(3-phénoxypropoxy)acétophénoneoxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-2-phényléthanoneoxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanoneoxime,
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-méthylpropanoneoxime ou
 3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyacétophénoneoxime.

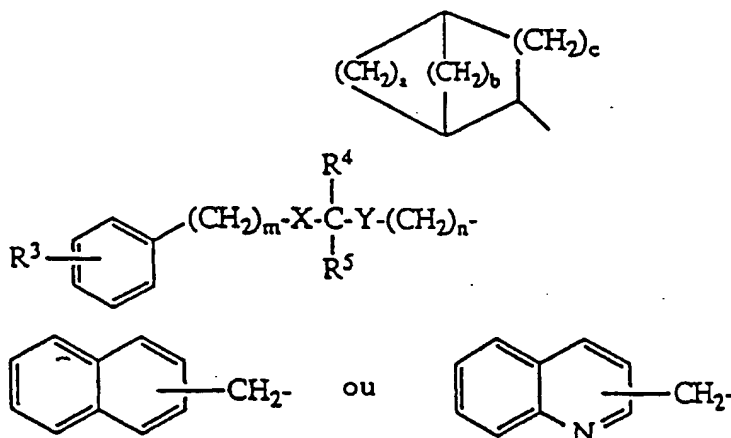
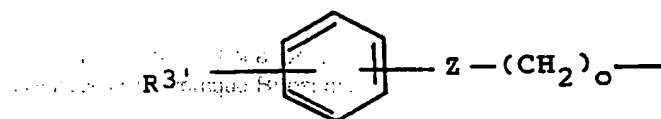
13. Procédé suivant la revendication 11, dans lequel le composé de formule (II) préparé est la 4-méthoxy-3-(3-phénoxypropoxy)acétophénone.

Revendications pour l'Etat contractant suivant : GR

1. Procédé de préparation d'un composé de formule :



où

R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,R¹ est hydrogène, alcoyle en C₁₋₆ ou

a est 1 à 3;

b est 1 à 3;

c est 0 à 2;

35 X, Y et Z sont chacun indépendamment une liaison, O, S ou NH, à la condition que si l'un des X ou Y est O, S ou NH, l'autre doit être une liaison;

R² est amino, (alcoyle en C₁₋₆)amino, arylamino, alcoxy en C₁₋₆ ou aryloxy;

R³ et R⁴ sont indépendamment hydrogène, halo, hydroxyle, alcoxy en C₁₋₆, aryloxy, alcanoyloxy en C₂₋₇, amino, (alcoyle en C₁₋₆)amino, arylamino ou (alcanoyle en C₂₋₇)amino;

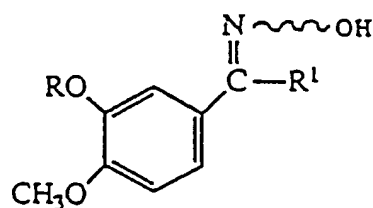
R⁴ et R⁵ sont chacun indépendamment hydrogène ou alcoyle en C₁₋₆;

m est 0 à 4;

n est 1 à 4, et

o est 1 à 4, qui comprend l'un des suivants :

a) carbamoylation d'un oxime de formule :



(III)

où

55 R et R¹ sont comme défini ci-dessus, au moyen d'un isocyanate, agent de carbamoylation approprié pour donner un composé de formule (I), dans lequel R² est amino, alcoylamino en C₁₋₆ ou arylamino;

ou

b) carbonatation d'un oxime de formule (III) comme défini ci-dessus, au moyen d'un agent de carbonatation contenant une partie (alcoyle en C₁₋₆ ou aryle) O-C(=O)- pour donner un composé de formule (I) où R² est alcoxy en C₁₋₆ ou aryloxy.

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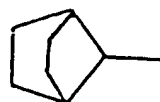
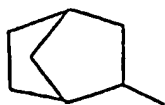
2. Procédé a) suivant la revendication 1, dans lequel l'agent de carbamoylation est le cyanate de sodium, l'isocyanate de chlorosulfonyle, l'isocyanate de trichloracétyle ou l'isocyanate d'alcoyle en C₁₋₆ ou d'aryle.

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3. Procédé b) suivant la revendication 1, dans lequel l'agent de carbonatation est le chloroformiate d'alcoyle en C₁₋₆ ou d'aryle.

4. Procédé suivant l'une quelconque des revendications 1 à 3, dans lequel R est alcoyle en C₃₋₇, cycloalcoyle en C₃₋₇,

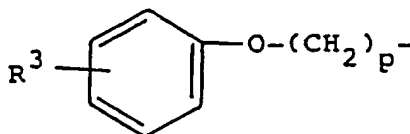
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ou

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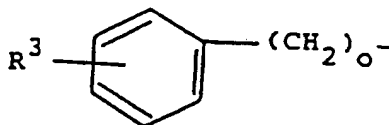


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dans lequel R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et p est 2 à 4.

5. Procédé suivant l'une quelconque des revendications 1 à 4, dans lequel R¹ est hydrogène, alcoyle en C₁₋₆ ou

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dans lequel R³ est hydrogène, halo, hydroxyle, acétoxy, amino ou acétamido et o est 1 à 4.

6. Procédé suivant l'une quelconque des revendications 1 à 5, dans lequel R² est NH₂.

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7. Procédé suivant l'une quelconque des revendications 1 à 5, dans lequel le produit est l'un des suivants :

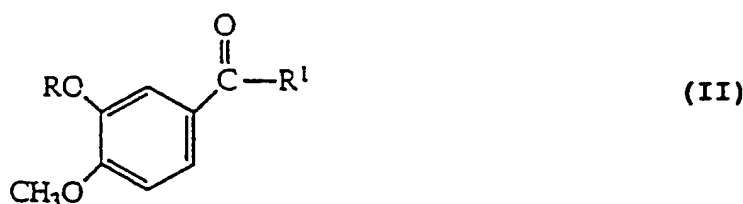
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- 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
- 1-[3(butoxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime;
- 1-[4-méthoxy-3-(3-phénoxypropoxy)phényl]éthanone-(E)-O-(aminocarbonyl)oxime;
- 1-(3-cyclopentyloxy-4-méthoxyphényl)-2-phényléthanone-(E)-O-(aminocarbonyl)oxime;
- 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanone-(E)-O-(aminocarbonyl)oxime;
- 1-[3-(cyclopentyloxy)-4-méthoxyphényl]-3-méthylbutanone-(E)-O-(aminocarbonyl)oxime;
- 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
- 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[(méthylamino)carbonyl]oxime;
- 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-[phénylamino]carbonyl]oxime;
- 1-[3-(cyclopentyloxy)-4-méthoxyphényl]éthanone-(E)-O-(méthoxycarbonyl)oxime;
- 1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(méthoxycarbonyl)oxime;

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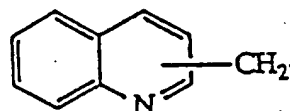
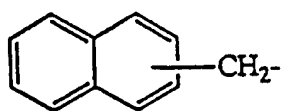
1-(3-butoxy-4-méthoxyphényl)éthanone-(E)-O-(phénoxy-carbonyl)oxime, et
1-[3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyphényl]éthanone-(E)-O-(aminocarbonyl)oxime.

8. Procédé de préparation d'une composition pharmaceutique, qui comprend la mise en association d'un composé de formule (I) tel que défini à la revendication 1, avec un excipient pharmaceutiquement acceptable.
9. Oxime de formule (III) tel que présenté et défini à la revendication 1, étape a), à la condition que lorsque R¹ est hydrogène, alors R est autre que alcoyle en C₃₋₇.
10. Procédé de préparation d'un oxime de formule (III) tel que défini à la revendication 9, qui comprend l'oximation d'une cétone correspondante.
11. Composé de formule (II) :

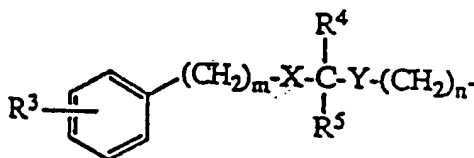


dans lequel :

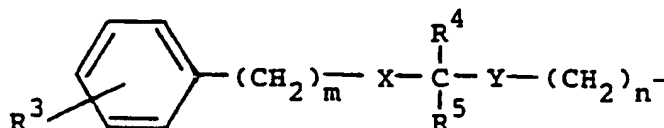
a) R¹ est alcoyle en C₁₋₄ et R est :



ou



où R³, m, X, Y, R⁴, R⁵ et n sont tels que définis à la revendication 1, pourvu que le radical :

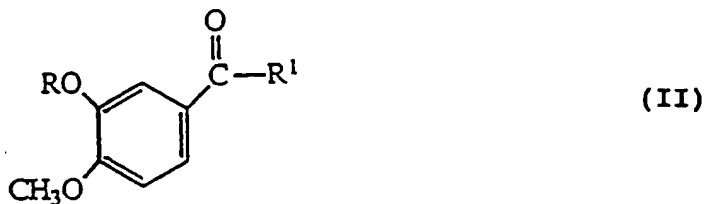


a plus de 8 atomes de carbone lorsque X et Y sont tous deux des liaisons et de plus, que R est autre que PhCH₂OCH₂-lorsque R¹ est méthyle,

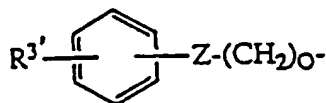
ou

b) R¹ est alcoyle, dans lequel le nombre d'atomes de carbone est supérieur à 4 et non supérieur à 6 et R est comme défini à la revendication 1.

12. Composé de formule (II) :



dans lequel R¹ est



20 où R^{3'}, Z et o sont tels que définis à la revendication 1, et R est tel que défini à la revendication 1.

13. Procédé de préparation d'un composé de formule (III) tel que défini à la revendication 11 ou 12, qui comprend l'oxydation d'un alcool correspondant.

25 14. Composé de formule (III) suivant la revendication 9, qui est l'un des suivants :

- 3-cyclopentyloxy-4-méthoxyacétophénoneoxime;
 3-butoxy-4-méthoxyacétophénoneoxime;
 4-méthoxy-3-(3-phénoxypropoxy)acétophénoneoxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-2-phényléthanoneoxime;
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-phénylpropanoneoxime,
 1-(3-cyclopentyloxy-4-méthoxyphényl)-3-méthylpropanoneoxime ou
 3-(bicyclo[2,2,1]hept-2-yloxy)-4-méthoxyacétophénoneoxime.
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15. Composé de formule (II) suivant la revendication 13, qui est la 4-méthoxy-3-(3-phénoxypropoxy)-acétophénone.

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